A STUDY ON EMERGENCY APPENDECTOMY IN

PER-OPERATIVEAPPENDICULAR MASS

Dissertation
Submitted in partial fulfillment of the regulations of

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Department of General Surgery

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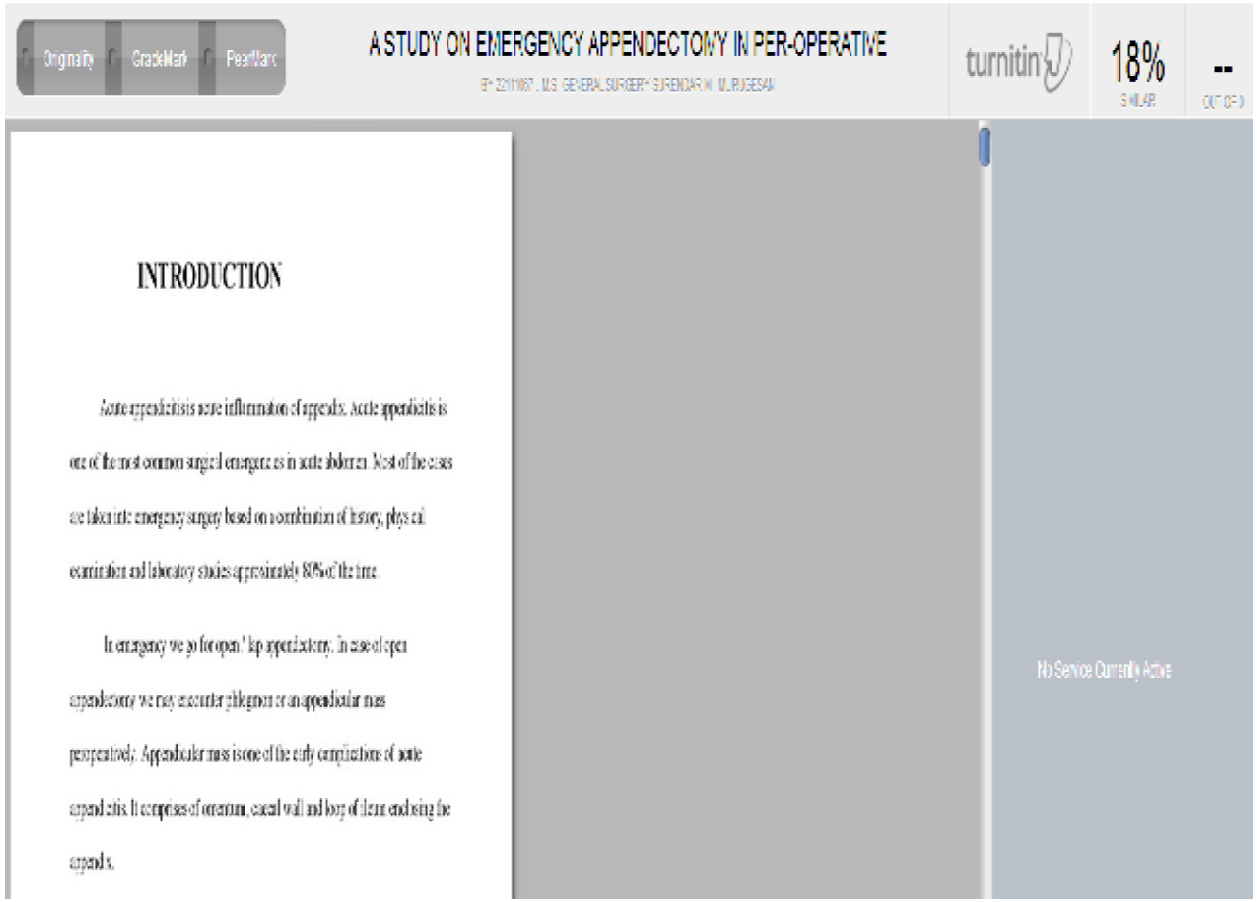
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INTRODUCTION
Acute appendicitis is acute inflammation of appendix. Acute appendicitis is
one of the most common surgical emergencies in acute abdomen. Most of the cases
are taken into emergency surgery based on a combination of history, physical
examination and laboratory studies approximately 80% of the time.
In emergency we go for open lap appendectomy. In case of open
appendectomy we may encounter phlegmon or an appendicular mass
postoperatively. Appendicular mass is one of the early complications of acute
appendicitis. It comprises of omentum, caecal wall and loop of ileum enclosing the
appendix.
No Service Currently Active

CERTIFICATE

This is to certify that this dissertation titled

"A STUDY ON EMERGENCY APPENDECTOMY IN PEROPERATIVE APPENDICULAR MASS"

is the bonafide work done by **Dr. Surendar M.,** Post Graduate student (2011 – 2014) in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under my direct guidance and supervision, in partial fulfillment of the regulations of The Tamil Nadu Dr. M.G.R Medical University, Chennai for the award of M.S., Degree (General Surgery) Branch - I, Examination to be held in April 2014.

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DECLARATION

I, **DR. M. SURENDAR** solemnly declare that this dissertation titled "**A STUDY ON EMERGENCY APPENDECTOMY IN PEROPERATIVE APPENDICULAR MASS**" is a bonafide work done by me in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under the guidance and supervision of my unit chief.

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Place: Chennai.
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CONTENTS

INTRODUCTION

AIM AND OBJECTIVES

HISTORY AND MILESTONES

EMBRYOLOGY AND ANATOMY

EPIDEMIOLOGY AND ETIOLOGY

PATHOLOGY AND NATURAL HISTORY

CLINICAL FEATURES

INVESTIGATIONS

TREATMENT

MATERIALS AND METHOD

PROFORMA

RESULTS AND DISCUSSION

CONCLUSION

BIBLIOGRAPHY

ANNEXURES

A STUDY ON EMERGENCY APPENDECTOMY IN PER OPERATIVE APPENDICULAR MASS

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Keywords – appendix ,appendicular mass ,appendectomy

ABSTRACT

INTRODUCTION

Acute appendicitis is acute inflammation of appendix. Acute appendicitis is one of the most common surgical emergencies in acute abdomen. Most of the cases are taken into emergency surgery based on a combination of history, physical examination and laboratory studies approximately 80% of the time.In emergency we go for open / lap appendectomy. In case of open appendectomy we may encounter phlegmon or an appendicular mass peroperatively.

METHODS

Appendicular mass is one of the early complications of acute appendicitis. It comprises of omentum, caecal wall and loop of ileum enclosing the appendix. My study deals with emergency appendectomy done for appendicular mass during such circumstances. Patients are subjected to surgery and observed. In this study 54 cases of acute appendicitis which were taken up for emergency appendectomy and were per-operatively found as appendicular mass was studied Post operative complications as fever, pelvic abscess, fistula and sepsis are watched over. They are observed during the hospital stay and periodically after discharge.

RESULTS

The following observation were made and tabulated as Operative findings ,Total operating time and Post operative complications. The operative timings and the operative findings determine the outcome of the surgery. Most cases the operative timing was around 60-90 mins. Out of the 54 patients 14 of them developed fever , 4 of them developed pelvic abscess and fistula for one case and rest of them went uneventful.

CONCLUSION

Appendicitis complicated by appendicular mass formation is encountered by delay in initial treatment.Appendicular mass intervened by emergency surgery ensures complete recovery for the patient at first admission.Emergency appendectomy rules out other possibilities.The peroperative findings and operative timings decide the outcome of the surgery. On follow up the most common complication is fever.Initial intervention reduces the hospital stay and further morbidities.To conclude Emergency appendectomy is safe and feasible in appendicular mass.

INTRODUCTION

Acute appendicitis is acute inflammation of appendix. Acute appendicitis is one of the most common surgical emergencies in acute abdomen. Most of the cases are taken into emergency surgery based on a combination of history, physical examination and laboratory studies approximately 80% of the time.

In emergency we go for open / lap appendectomy. In case of open appendectomy we may encounter phlegmon or an appendicular mass peroperatively. Appendicular mass is one of the early complications of acute appendicitis. It comprises of omentum, caecal wall and loop of ileum enclosing the appendix.

My study deals with emergency appendectomy done for appendicular mass during such circumstances. Patients are subjected to surgery and observed. Post operative complications as fever, pelvic abscess, fistula and sepsis are watched over. They are observed during the hospital stay and periodically after discharge.

The study deals the safety and outcome of the operative procedure along with complications following if any during the period of time mentioned below.Patients are subjected to the study from January 2013 to November 2013 and the results are tabulated.

AIMS & OBJECTIVES

- To know the prevalence of the disease in patients admitted and treated in Government Stanley medical college , Chennai
- To study the safety and results of the operative procedure
- To tabulate the complications arising due to the surgeries or the disease process itself.

HISTORY AND MILESTONES

Leonardo da Vinci- 1492- Showed appendix in drawings and called it "orecchio" (little ear)

Berengario da Carpi- 1521- First person to describe the appendix

Giovanni Battista Morgagni- 1719- First detailed anatomic description of appendix

Claudius Amyand- 1736- Performed the first appendectomy

John Hunter- 1767- Described gangrenous appendix at autopsy

Goldbeck- 1830-Described acute suppurative appendicitis but said cause was irritation of cecum; first use of term "perityphlitis"

Krönlein- 1884- Perhaps, rather than Amyand in 1736, was first to perform appendectomy

Reginald Heber Fitz- 1886- Advocated early surgical removal of acute appendix; first used term "appendicitis"

Thomas G. Morton- 1887- Successful operative removal of perforated appendix with draining of abscess

Charles McBurney- 1889- Described abdominal point tenderness (McBurney's point) . June, 1894 - Presented "gridiron incision" (McBurney's incision) to Chicago Medical Society (CMS)

Harrington, Weir, and Fowler- 1899- Described medial extension of gridiron incision by dividing lateral portion of rectus sheath.

A.J. Ochsner- 1902- Advocated nonoperative treatment to localize spreading peritonitis

H.A. Kelly- 1905- Advocated against "ligating, amputating, and burying the little stump"

A. E. Rockey,- 1905- Each advocated transverse skin incision (later called Rockey-Davis incision)

deKok- 1977- Laparoscope-aided appendectomy with mini-laparotomy

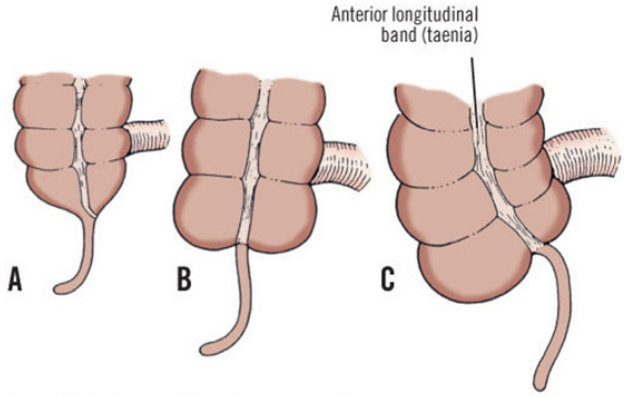
Semm- 1983- Laparoscopic appendectomy

EMBRYOLOGY AND ANATOMY

EMBRYOGENESIS - Normal Development

The appendix is a narrow , hollow tube in the terminal portion of the embryonic cecum. The appendix becomes differentiated by its failure to grow as fast as the proximal cecum. The growth rate of appendix decreases to that of caecum as age advances. At birth, the size of the colon is four times that of the appendix. When it is fully developed, it is almost 8-8.5 times larger.

The appendix is visible at about the eighth week of gestation. At first, it is elongated from the apex of the cecum. As the cecum grows, the appendix shifts medially toward the ileocecal valve . The appendix marks the starting place for the taenia of longitudinal muscle coat of the colon, showing the same displacement. Three types of cecum and appendix. A and B. Infantile forms. When present in the adult, they represent mild developmental arrest. C. Mature and most common form.



The medial shift of the adult appendix fails to occur in 5-15% of individuals. In these cases, the appendix is funnel-shaped . If the appendix is of normal shape, it is still located symmetrically on the cecal apex.

Until the 12th week, the appendix is circular in cross-section and after that it slowly appears as lobed. Villi are usually found in the fourth and fifth months, disappearing normally before birth. It has large aggregations of lymphoid nodules in the wall layers . They increase in size up to puberty, after they gradually decrease. Obliteration of lumen is common in elderly patients.

Congenital Anomalies

Because of its seemingly vestigial nature, one would expect to find great variability of the appendix, but this is not the case. Appendiceal variations are few, and are all rare. Although in humans the appendix appears to be vestigial as a digestive organ, it emerges as a fully developed and functional lymphoid organ.

Absence of the Appendix

Congenital abscence of appendix is due to failure of elongation from caecum during the eighth week. The appendix may have grown along with the caecum at an equal rate. But it cannot be demarcated from the caecum or ascending colon. The latter is probably the case where there are more than four haustra in the cecum.

According to Williams, the possibility of appendiceal auto amputation, intussusception, or volvulus suggests that any diagnosis of agenesis should be preceded by inspection of the bowel and abdominal cavity for a mummified appendix. Chevre et al., who encountered a case of appendiceal agenesis, cautioned that the diagnosis not be made without thorough exploration of the ileocecal and retrocecal areas.

Ectopic Appendix

Fawcitt found an appendix in the thorax, in association with malrotation and diaphragmatic defect. Babcock reported the removal of an appendix in the lumbar area. Abramson presented a case of an appendix which was located within the posterior cecal wall, and which did not have a serous coat.

Left-Sided Appendix

There are conditions that can result in a left sided appendix. In frequency, they are: (1) situsinversusviscerum, (2) nonrotation of the intestines, (3) "wandering" cecum with a long mesentery, and (4) an excessively long appendix crossing the midline..

Situsinversus can be predicted by noting the position of the patient's heart. Nonrotation, however, may not be recognized if there are no radiographic films available. Further, it should be noted that in about one-half of patients with situsinversus, the pain of appendicitis is felt in the right lower quadrant .

If the cecum and appendix are not in the right iliac fossa, the right paravertebral gutter and the right subhepatic space should be searched. If the cecum still cannot be found, the incision should be closed. A midline incision should be made that will give access to both the left and right lower quadrants.

Duplication of the Appendix

Waugh described three types of duplication of the appendix:

Double-barreled appendix,-with a common muscularis and often a distal communication between the lumina (this type of tubular duplication is also found elsewhere in the large and small intestine).

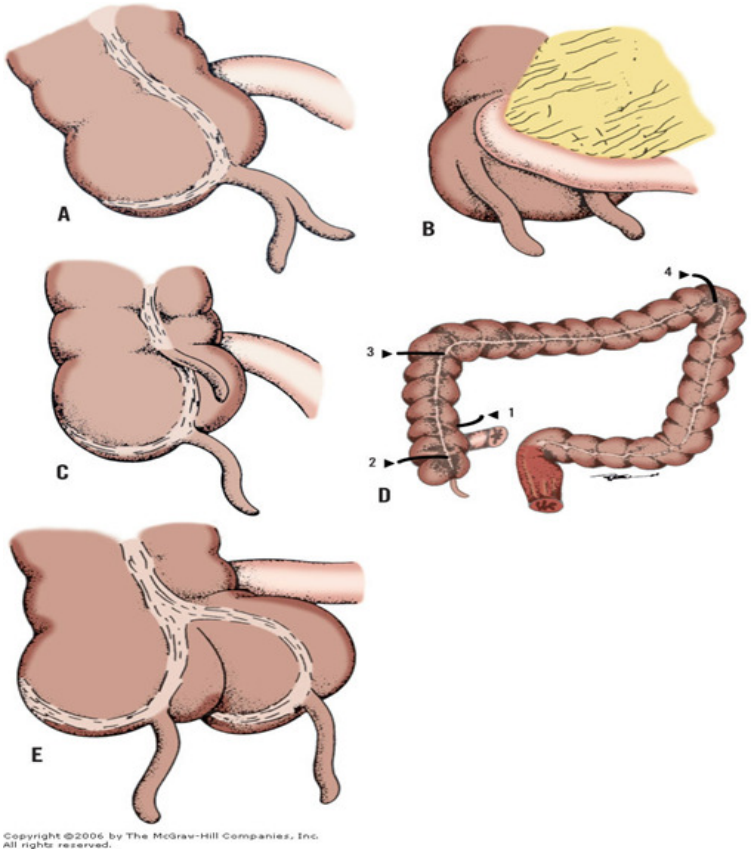
"Bird-type" paired appendix- Structures are symmetrically placed on either side of the ileocecal valve (this condition occurs in conjunction with other severe defects, and may be a mild form of hindgut twinning).

Taenia coli-type duplication- A normal appendix develops at the usual site, and an additional small appendix forms on a taenia. This may represent a continued development of the transitory cecal protuberance observed from the sixth to the seventh week of development.

Appendiceal duplications as classified by Cave andWallbridge . Kjossev and Losanoff found a second appendix at the splenic flexure , which they considered to be a new subtype of the Cave-Wallbridge Type B anomaly.

Duplication is rare; Collins found only two cases of true congenital double appendix and one case of post-inflammatory pseudo-duplication in 71,000 specimens.Arda et al., reporting in 1992, expanded case reports to around 100. A triplicated appendix with other anomalies was reported by Tinckler; a horseshoe

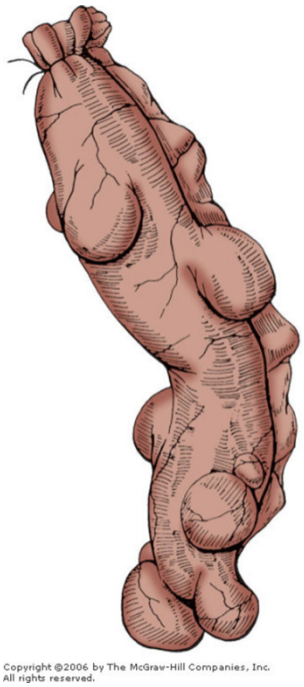
appendix having a patent continuous lumen with two separate openings into the cecum and a fan-shaped mesoappendix was discovered during surgery by Mesko et al.



Congenital Appendiceal Diverticula

The appendiceal diverticular formation is as same as the other bowel. Neverthless there also incidence of the formation of true congenital appendicular diverticula .

Favara found an association between genetic abnormalities and congenital diverticula.



Heterotopic Mucosa in the Appendix

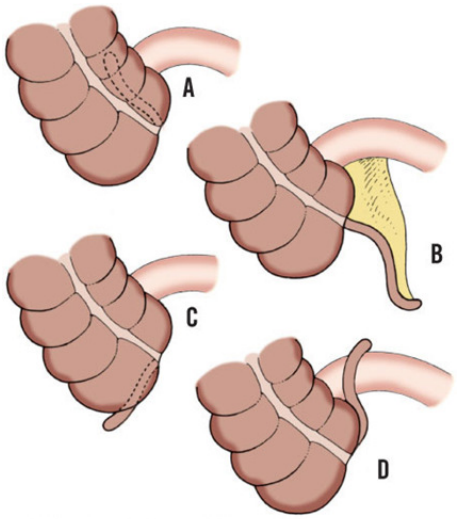
Gastric and oesophageal mucosa sometimes pancreatic tissue, have been reported in the appendix. Haque et al. found heterotopic bone associated with mucin-producing tumors of the appendix.

SURGICAL ANATOMY

Topography, Position, and Relations

The appendix arises from the cecum, which is related to the liopsoas muscle posteriorly and the lumbar plexus of nerves. It is related to the abdominal wall, the greater omentum, and ileumanteroirly. In the cadaver, the apex of the cecum is usually found slightly to the medial side of the middle of the right inguinal ligament.

In living individuals the position of the cecum varies with posture, respiration, abdominal muscle tone, and state of intestinal distention. When an individual is standing upright, the cecum and appendix often hang over the pelvic brim. From the apex of the cecum the appendix can point to any direction inside the peritoneal cavity . The tip of the appendix can be found adherent to any of the internal viscera excluding spleen.



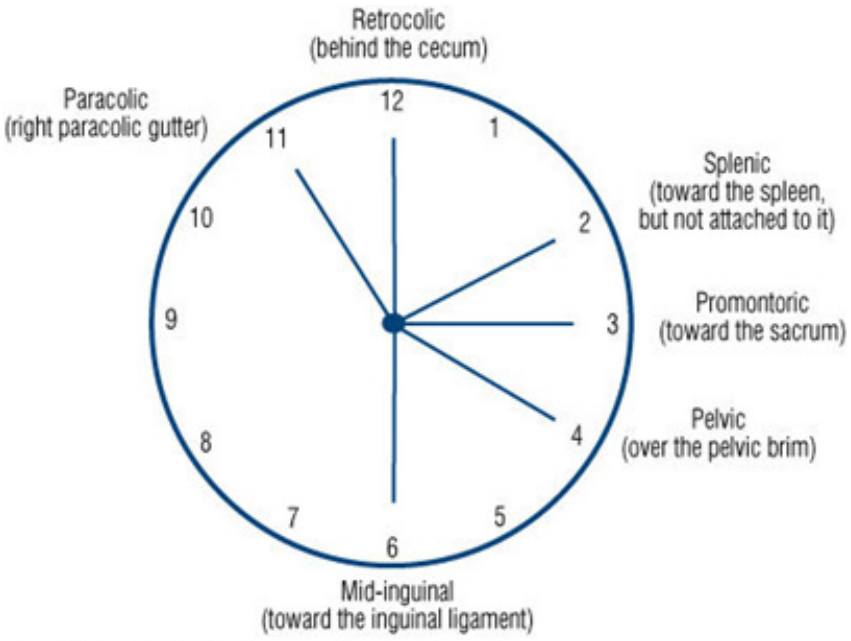
There is little doubt that the terminology used to describe the position of the appendix is a major source of confusion to those who would attempt to apply the descriptions in the literature to the reality of the operating room. Sir Frederick Treves derived a schema for appendiceal positions based on the hands of a clock.

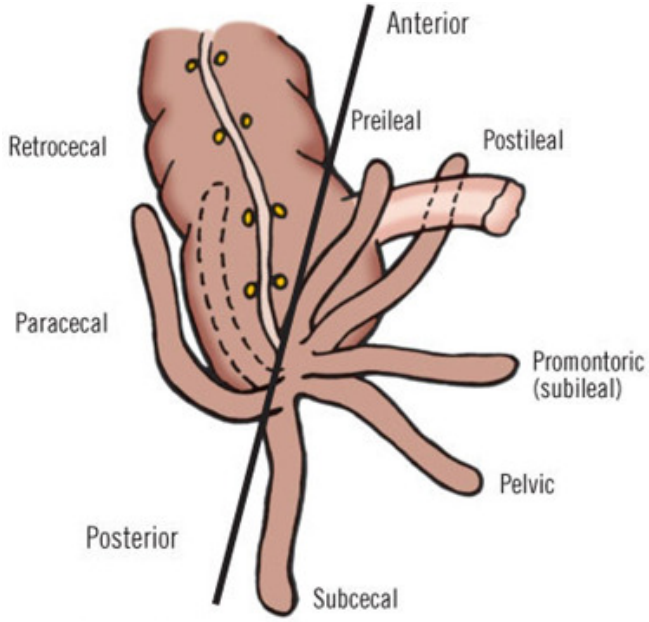
The exact meaning of "retrocecal" is disturbingly unclear in a report by Wakeley in 1933, in which he reviewed 10,000 postmortem cases. He who described the various locations of the appendix.

They are

- Retrocecal
- Pelvic
- Subcecal
- Ileocecal
- Ileocecal

  If the position of the appendix is "retrocecal" or "retrocolic," does this indicate whether the organ is intraperitonealor extraperitoneal?





Appendiceal Wall

The appendiceal wall is similar to the wall of the colon. It is formed by

- The serosa
- A muscular layer composed of the longitudinal and circular layers. At the appendiceal base, the longitudinal muscle produces a thickening that is related to all cecaltaeniae
- The submucosa, which contains many lymphoid islands
- The mucosa

According to Owen and Nemanic, columnar epithelial cells and attenuated antigen-transporting membrane or M cells cover the mucosa. Ferguson stated that

even though the association between columnar epithelial cells and lymphocytes within the epithelial layer of the gut and other organs is well known, much work remains to establish the real role of interactions between lymphocytes and the enteric mucosa.

Mesentery of the Appendix

Hollinshead proposed that "since the appendix is a part of the cecum and the latter has no true mesentery, the appendix does not either; however, there is usually a peritoneal fold enclosing the artery to the appendix which is commonly referred to as the mesenteriole or mesentery of the appendix."

The mesentery of the appendix is embryologically derived from the posterior side of the mesentery of the ileum close to the ileocaecal junction. It is suspended from the terminal ileum by the meso-appendix. It contains the appendicular vessels. The mesentery frequently appears to be too short for the appendix, which may be sharply bent on itself.

Morphology of the Appendix

The posteromedial side of the cecum gives origin to the vermiform appendix about 2 cm from the terminal part of the ileum. Variations have been found in the diameter of the appendix at its base at the cecum: Hollinshead found an average of 0.6 cm, Anson and McVay50 reported an average of 0.8 cm, and Maingot found a range of 0.5-1.5 cm.

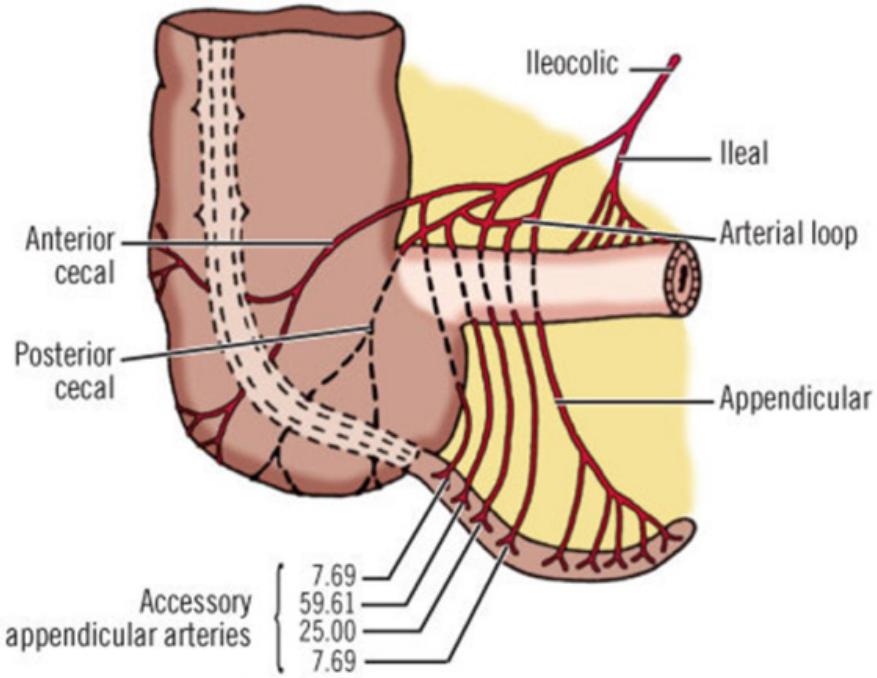
Vascular Supply

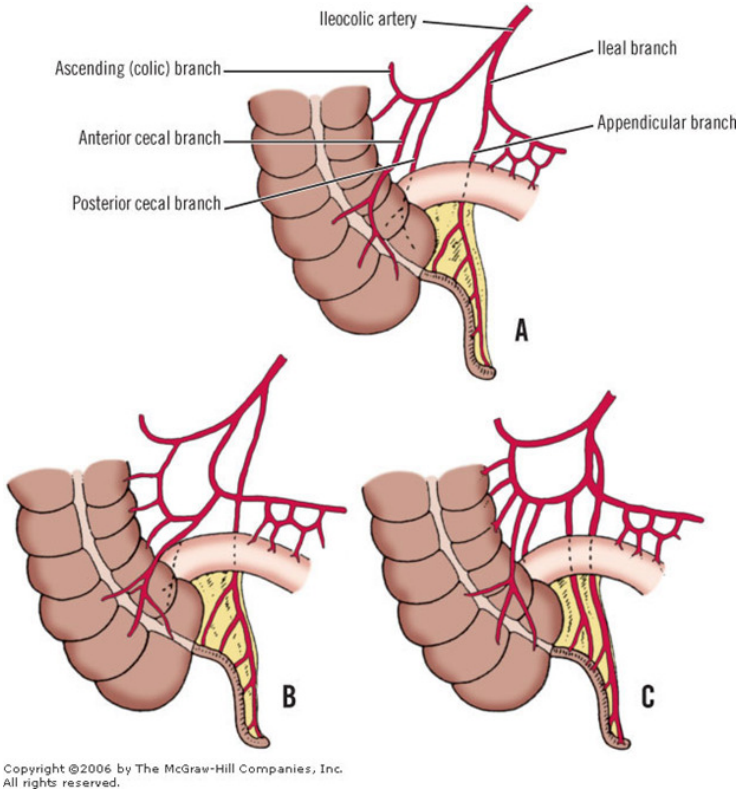
The root of arterial supply for appendix starts from the superior mesenteric artery. From it through the ileocolic artery.From it by the ileal artery or by the caecal artery. Though the appendicular artery is usually singule ,Michels found two appendicular arteries in 10 of 132 specimens examined .

A much higher frequency of duplication among Indian subjects was reported by Shah and Shah. In 30% of their subjects, there were two arteries. The base of the appendix has a dual blood supply from the appendicular artery as well as the caecal artery.

The appendicular vein and artery are suspended by the mesentery of the appendix. The appendicular vein joins cecal veins to become the ileocolic vein,

which joins the right colic vein. The appendicular artery along with the veins getthrombosed in case of appendicular necrosis.



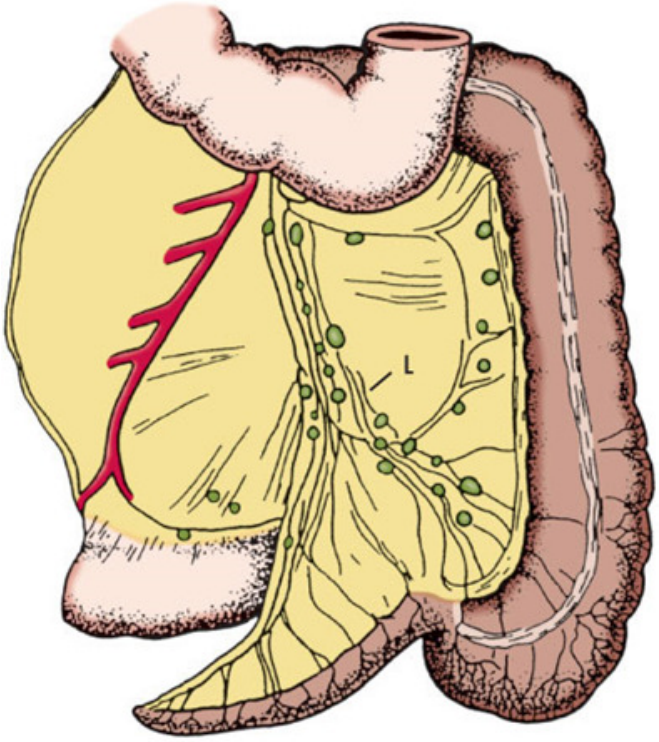


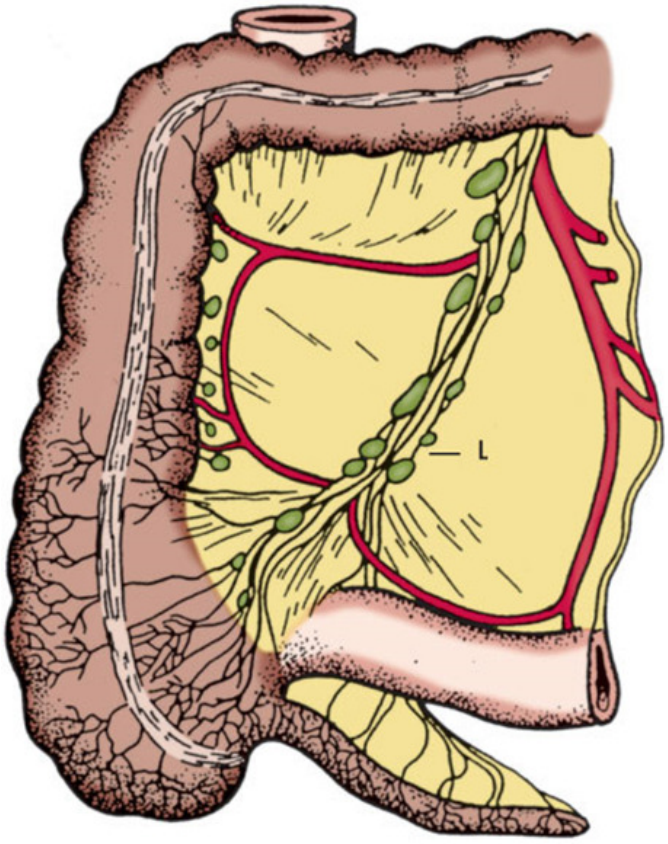
Lymphatic Drainage

Lymphatic drainage from the ileocecal region is through a chain of nodes along the major vessels supplying the appendix and terminal ileum.

Appendicular ⟶ Ileocolic ⟶ Superior mesentric ⟶ Celiac ⟶ Cisterna chyli

A secondary drainage to subpyloric nodes was described by Braithwaite. The lymph nodules in the wall of the appendix are not connected with the lymphatic drainage of the organ. The lymphocytes formed in the aggregations pass into the lumen of the appendix.





Innervation

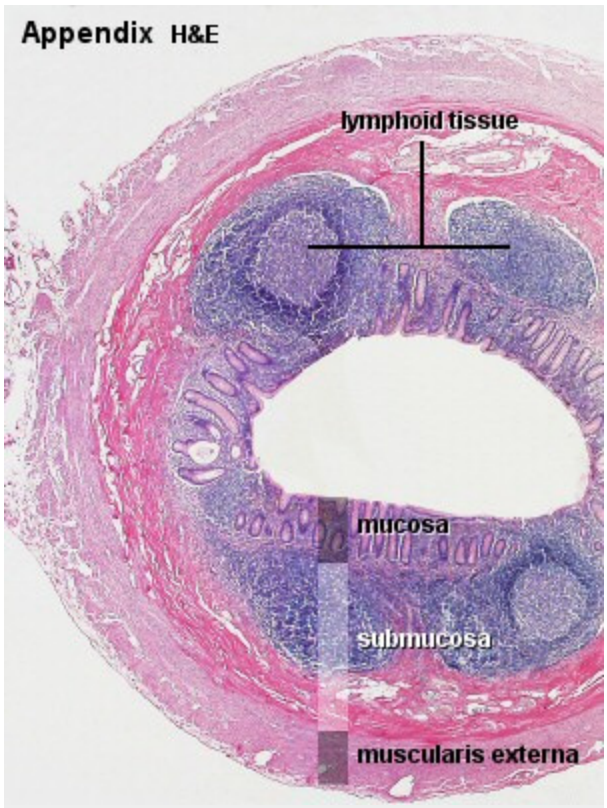
Sympathetic innervation of the appendix comes from the celiac and superior mesenteric ganglia. Parasympathetic innervation comes from the vagus nerve. Sensory innervation for pain is carried by the eighth thoracic spinal nerve, or perhaps by the 10th and 11th thoracic nerves.

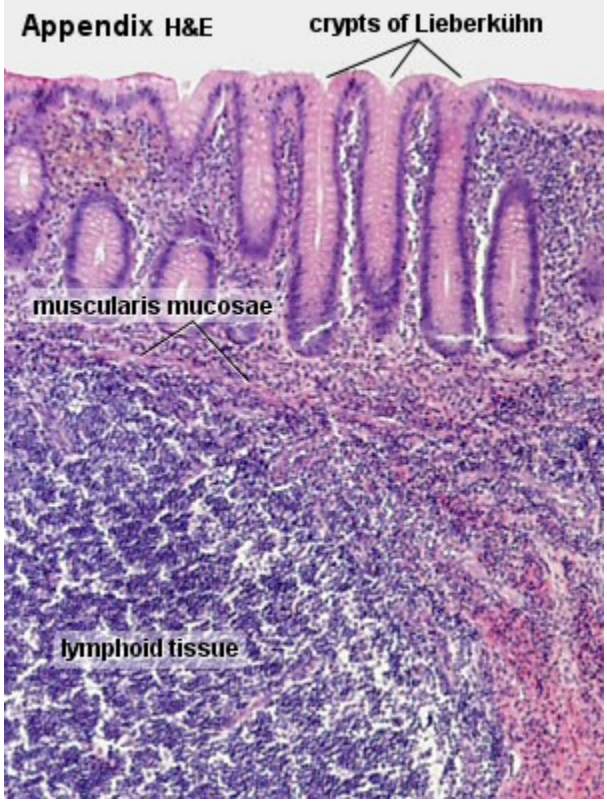
PHYSIOLOGY- The physiologic action of this appendix in human beings is not known. Due to the presence of abundant lymphatic follicles however, it is accepted that the appendix performs immune functions. But this does not mean that a normal appendix should not be removed in an exploratory (diagnostic) laparotomy. The reason is very simple: there is the possibility of future acute appendicitis with or without gangrene, perforation, and localized or generalized peritonitis.

Histology

Though the thick appendiceal wall has the same four layers as the colon (serosa or adventitia, muscularis externa, submucosa, and mucosa), it differs by having the following characteristics: its outer layer of longitudinal smooth muscle is complete, and the mucosa and submucosa have multiple lymph nodules.The histology of the

appendix has been considered previously in this chapter under the heading "Appendiceal Wall."


Appendix H&E
lymphoid tissue
mucosa
submucosa
muscularis externa


Appendix H&E
crypts of Lieberkühn
muscularis mucosae
lymphoid tissue

EPIDEMIOLOGY AND ETIOLOGY

Agewise

Appendicitis is usually a disease of childhood and early adulthood. The lymphoid follicles are well developed in this age group. Due to the infections in appendix it probably stimulates the lymphoid follicles. The lymphoid follicles get hypertrophied and occlude the lumen.

This is more commonly seen in this age group. The immaturity of the immune system in early childhood an explanation for the tendency for remote agents like air pollutants, sand and dusts to be associated with the incidence of appendicitis. In the age less than five years due to the immaturity of the immune system and in older age groups due to the atrpohy of the wall and also due to the sealing of the lumen of appendix explains why it is of low incidence in these age groups.

Sex

Though there is an increased incidence of appendicitis in boys it is not usually not due to the formation of fecolith. But as the maturity of age there is an increased incidence of appendicitis where sex hormones are more active . This explains the role of hem in the pathogenesis of it. But this relation doesn't correlate

with increased incidence of autoimmune diseases like SLE , grave's disease , multiple sclerosis and myasthenia gravis being more frequent in females is not very clear.

Estrogen and progestrone have seen implicated in the modulation of immuno-suppressive state of pregnancy and hence the difference of these hormones in male and female may be the reason. Antigen presenting cells have tolerance to express estrogen receptors in their surface explaining that sex hormones modulate their functions.

One study suggests that due to gender specific differences in LPS explains the better prognosis in females. The underlying mechanism may be due to alterations to mitogen activated protein kinase phosphorylation.

Familial appendicitis

Appendicitis runs in some families. Children with appendicitis are three times more likely to have a positive family history of appendicitis in first degree relatives than controls. Similar observations had been made in smaller studies earlier . These familial associations, however, do not prove a genetic component since members of families often share similar environments.

Racial variation

Racial variation in the incidence of appendicitis is difficult to investigate. Poverty and low levels of public hygiene are difficult to separate for many peoples of African, Hispanic or Asian ancestry. One study from the USA comparing the incidence of appendicitis in various ethnic groups concluded that the rate was lower in Negroes and Asians in comparison to Caucasians and Hispanics .

A case-control study from Brazil comparing the people of that country on the basis of skin colour claimed that race was a factor in the incidence of appendicitis.. A study on phenotypes as an indicator of genotypes in the same country concluded: “Our data suggest that in Brazil, at an individual level, color, as determined by physical evaluation, is a poor predictor of genomic African ancestry, estimated by molecular markers” .

From the Republic of South Africa, another multiracial society, some publications suggest that appendicitis has racial associations. The incidence of appendicitis in Black children was estimated at 8.2 per 100,000 which is 10-20 times less than the incidence in their White compatriots .

It should be remembered that the Apartheid political system in the country at the time left the native Africans economically and social disenfranchised with a

standard of living that was not comparable to their White counterparts. What these studies share is the inability to separate race from poverty.

Geographic distribution

The different incidences found across geographic regions are possibly explained by economic and public health factors rather than by environmental factors. Appendicitis is less common in sub-Saharan Africa and Asia may have more to do with shared poverty and underdevelopment and less to do with geography.

Seasonal variation

Seasonal variations in appendicitis are reported in several studies across many regions.Most studies report a summer peak with a winter nadir .Study in northern Saudi Arabia showed a winter low but a spring peak which coincides with the sandstorm season characterized by rise in infections and allergic conditions of the upper respiratory tract which concur with earlier studies on the spread of allergens during this season in Saudi Arabia . A similar seasonal variation to ours was reported four decades earlier in Britain .

Our observation of an association between appendicitis and air pollution was corroborated by a study from Western Canada .The significance of these

observations is underscored by pathological studies linking appendicitis to eosinophilic degranulation . Seasonal variation of appendicitis with its peak associated with a season characterized by high ambient pollen and other phyto-allergens or sandstorm is an observation that can neither be explained by diet nor fecaliths but may have a bearing on immune modulation playing a role.

Etiologic basis of appendicitis

Various hypotheses have been proposed to explain the etiology of appendicitis.

Mechanical etiology

Rendle Short first explained the association between low fibre diet and appendicitis causing an increased incidence of appendicitis in England. He explained a casual relationship with low cellulose content of foods imported.

The two main mechanical possibilities are fecoliths and intra colonic pressure.

Burkitt demonstrated a difference in the incidence of fecolith in appendicitis. Various studies have approved that fecolith in appendix have a geographic distribution. Diet rich in high fibre diet has an increase relationship with high intra colonic pressure , which is the main cause of diverticulosis. But diverticulosis is a

disease of old age rather than appendix which is seen in younger adults. This explains the rarity of diverticulosis in rural areas where the role of high intra colonic pressure in the pathogenesis cannot be excluded because of the difference in peak age of incidence.

A recent study has found similarity between appendicitis and diverticulitis in terms of low fibre diet and better hygiene explaining a coomon causation factor . Even fecoliths are found in the lumen of diverticuli and also in appendicitis specimen describing the similarities between them. But eventhough there is common cause it differs in the age spectrum.

Infection etiology

Specific infections due to various viruses , bacteria and parasites have been proposed for the cause of appendicitis suggesting a local invasion can evoke appendicitis. Viruses like Dengue ,EBV ,Rotavirus and CMV has also been implicated.

Bacterias like salmonella ,Brucella , Campylobacter and parasites like Entamaeoba , Schistosoma and Enterobious has also seen identified in the pathogenesis of appendicitis. The above said pathogens causes infection in lamina propria and edema causing obstruction of lumen of appendix resulting in

appendicitis. Since the virus has seasonal variations which might reflect in the incidence.

Even some outbreaks of Entero viruses or some Entero invasive bacterias explains the reason for some similar outbreaks of appendicitis. The infection etiologies explains that why some patients with history and signs of appendicitis recover well without surgery. This also explains the findings of fibrosis in the sub mucosa of the appendix showing previous inflammation. The infection etiologies is closely associated to hygienicity.

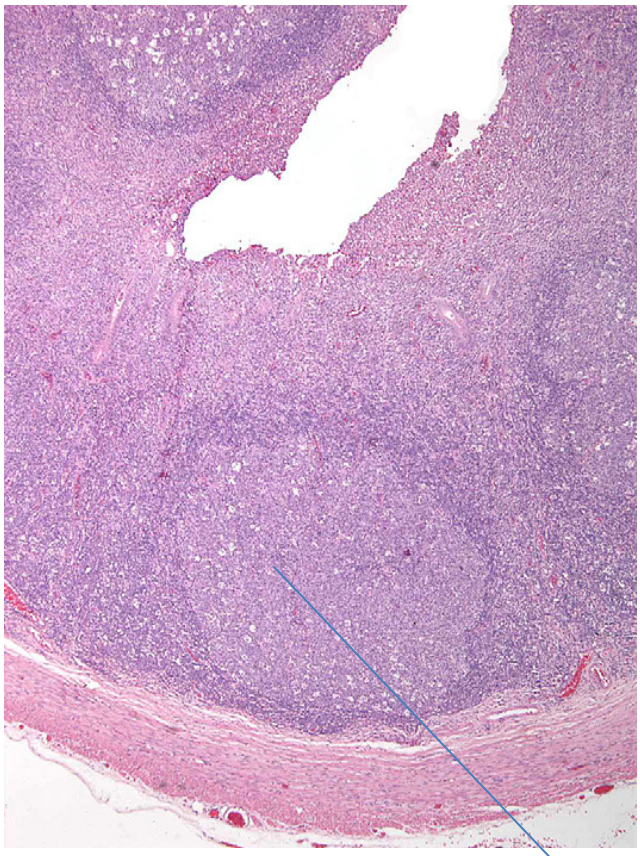
PATHOLOGY AND NATURAL HISTORY

Appendicitis is the most commonly encountered surgical emergencies in the casualty. Among the entire population seven percent of them will encounter appendicitis in their life time during 10-30 years of age.

Appendicitis is usually diagnosed on the basis of patients history and the clinical examination . Accurate diagnosis and surgical intervention may reduce the risk of mass ,perforation and its complications. Death due to uncomplicated appendicitis is <1% ,but in younger individuals and old age it may increase due to delay in diagnosis.

PATHOGENESIS

Appendix is a diverticular elongation from caecum more intra peritoneal in location which contains lymphoid materials. But when it gets inflammed it may become more anterior. It may be pelvic or retrocaecal in position. Infection occurs in appendix mainly due to



luminal obstruction , which occors because of **lymphoid hyperplasia** result of various viral bacterial , foreign bodies , parasites and fecoliths.

It may be comlicated by an appendicular mass. Mass is nothing but the inflammed appendix is wrapped round by the omentum and ileum . Mass if left untreated my lead onto perforation , necrosis and gangrene. The management of mass is a controversial field leading to a challenge to the surgeon.

Infections of Appendix

VIRUS --- Measles , Adenovirus ,CMV, EBV

BACTERIA --- Salmonella, Shigella, Yersinia,
Campylobacter,
Clostridium, Mycobacterium, Rickettsia

FUNGI --- Mucormycosis, Histoplasmosis

PARASITES --- Roundworm, Pinworm, Whipworm,
Schistosomes, Entamoeba, Balantidium
coli, Toxoplasma, Cryptosporidium,
Echinococcus

SOME HISTOLOGICAL FINDINGS OF MAJOR INFECTIONS

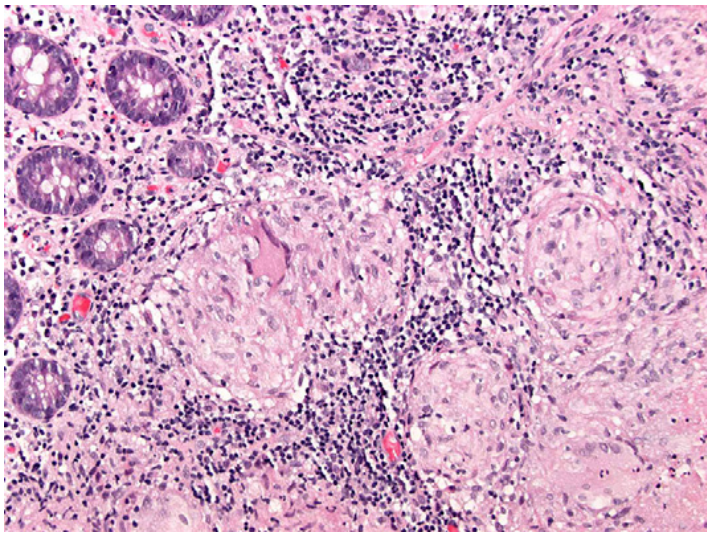
Tuberculosis of appendix

The appendix in tuberculosis is

- grossly inflamed
- with mural thickening
- adherentto the surrounding bowel with associated lymphadenitis.

The appendix shows lymphoid hyperplasia with associated caseating granulomas.

The mucosa is congested and shows multiple ulcerations.



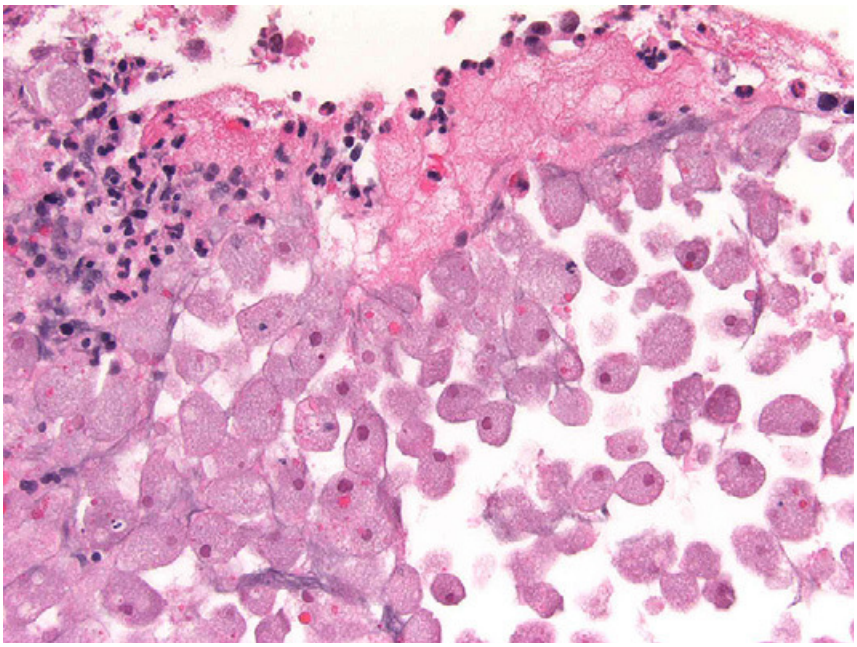
Entamoeba histolytica

When Entamoeba histolytica is found in the intestines it should be differentiated from the non harmful Entamoeba coli and the mono-macrophage system.

Amoebic trophozoites of Entamoeba histolytica have

- distinct cell membranes with foamy cytoplasm,
- round and eccentrically located nuclei with peripheral margination of chromatin
- and a central karyosome
- presence of ingested red blood cells is characteristic
- trichrome and periodic acid-Schiff positive
- nuclei are usually more rounded, smaller, paler, and have a more open nuclear chromatin pattern which differentiates them from macrophages

Macrophages shows positivity to CD68, a1-antitrypsin, and chymotrypsin but amoeba does not.



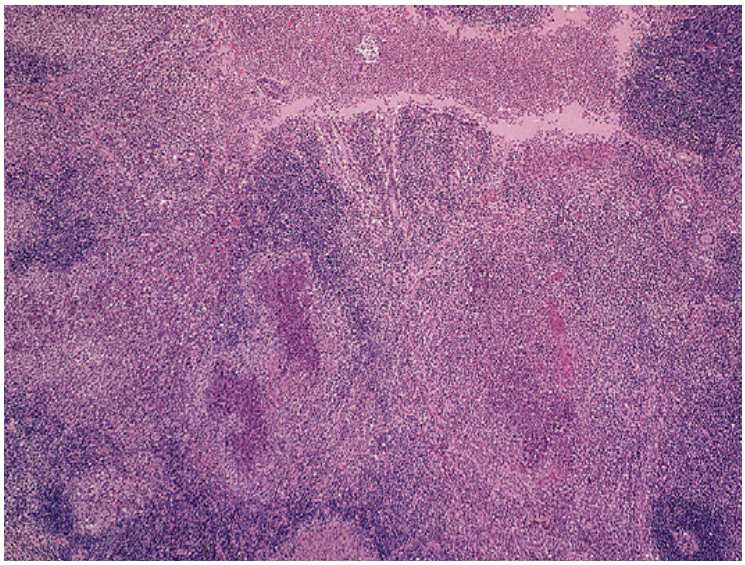
FOAMY CYTOPLASM

Yersinial infections

The appendixin Yersinial infections is

- thickened
- edematous wall with nodular inflammatorymasses centered on Peyer patches
- Aphthoid and linear ulcers

GI infectionwith Y pseudotuberculosis has been described characteristically as a granulomatous process with central microabscesses



Ypseudotuberculosis appendicitis, featuring granulomatous inflammation with prominent, irregularmicroabscesses and mucosal ulceration.

CLINICAL FEATURES

The clinical presentation of appendicitis is notoriously inconsistent. Patients with history of anorexia , periumbilical pain followed by nausea, right iliac fossa pain, and vomiting occurs in only in half of them.

Features include the following :

Abdominal pain:

Most common symptom. The patient says a colicky pain in the umblical region, which increases during the first 24 hours, becoming constant and sharp, and migrates to the right iliac fossa.The pain in the umblical region is due to the referred pain from the innervation to the midgut. The pain in the right iliac fossa region is caused due to the inflammation of the parietal peritoneum.

Nausea: 61-92% of patients

Anorexia: 74-78% of patients

Vomiting:

It is mainly due to irritation and reflex activities. When there is peritonitis patient may have profuse vomiting on food intake.

Diarrhea or constipation

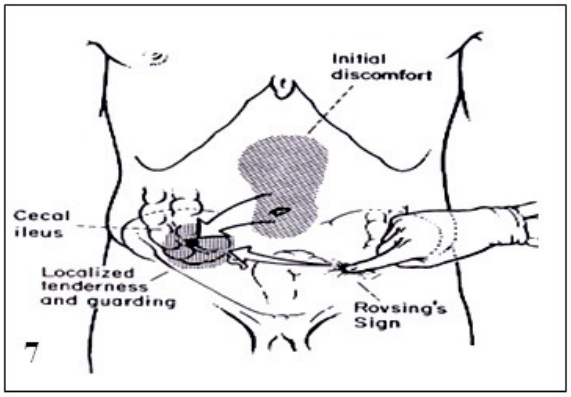
On Physical examination following are seen –

The most consistent and persistent sign is the right iliac fossa tenderness . Other findings include rebound tenderness , Pain while percussing the abdominal wall and features of peritonitis like gaurding and rigidity.

Sometimes the patients may exihibit left iliac fossa region tenderness when the appendix is very lengthy or in case of situs inversus. In male children sometimes the right side scrotum may be inflamed . During pregnancy it may not classically be in the right iliac fossa region it may ascend up as the gestational age increases to he right lumbar region or to the right hypochondrial region.

The following accessory signs may be present in a minority of patients:

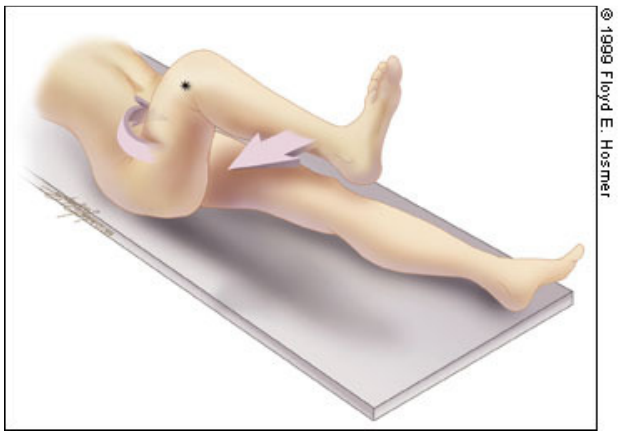
Rovsing sign



Pain in the roght iliac fossa region when palpating the left iliac fossa.

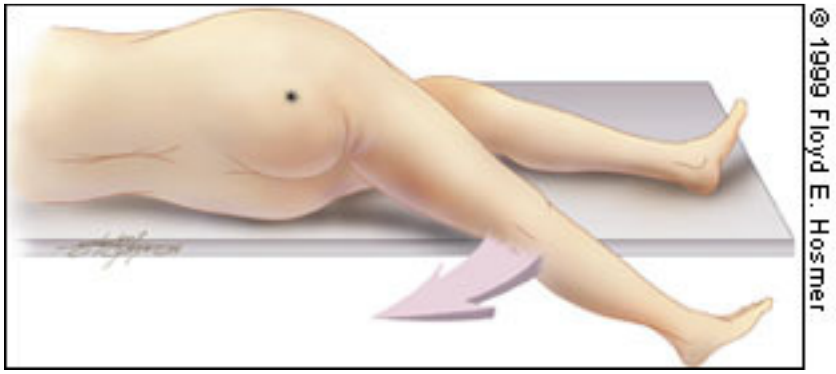
It is mainly due to peritoneal irritation.

Obturator sign :



Right iliac fossa region pain with internal and external rotation of flexed right hip.It shows that inflammed appendix is in pelvis

Psoas sign :



Right iliac fossa region pain with extension of the right hip or flexion of the right hip against resistance. It shows that appendix is located along the right psoas muscle

Dunphy's sign :

It is pain right iliac fossa region on coughing showing due to the peritoneal irritation

Markle sign or Jar tenderness :

It is pain in abdomen when the patient dropping from standing on the toes to the heels with a jarring landing. This shows peritoneal irritation.

Aure-Rozanova sign:

Pain on palpation with finger in right Petit triangle .

Bartomier-Michelson's sign:

Pain on palpation at the right iliac fossa region as patient lies on left side than on supine position.

Kocher's (Kosher's) sign:

Pain in the epigastric region or around the stomach at the beginning of disease with a subsequent shift to the right iliac fossa region.

Massouh sign:

A hard sweep of the examiner's index and middle finger across the patient's abdomen from xiphoid process to first the left and then the right iliac fossa region. A positive Massouh sign is a grimace of the patient upon a right sided sweep, because initial stage appendicitis usually causes localised irritation of the peritoneum

Sitkovskiy's sign:

Pain in the right iliac region as patient lies on left side.

The above mentioned signs only aid in the diagnosis of acute appendicitis. Conclusion should be arrived on the combination of clinical and laboratory

findings. That can be done by various scoring systems for acute appendicitis. The important and widely used scoring systems are discussed .

SCORING SYSTEM IN APPENDICITIS

The diagnosis of appendicitis is also simplified using clinical scoring systems. These systems have been based on symptoms, signs and laboratory findings.In adults the most commonly used score is the Alvarado score . Whereas, in children the pediatric appendicitis score or Samuel score is most commonly used.

ALVARADO SCORE

These variables could be recalled using the pneumonic MANTRELS. The maximum total score - 10. A score of 5 or 6 is diagnosis of acute appendicitis, with a score of 7 or 8 indicates probably appendicitis and a score of 9 or 10 indicates a very probably acute appendicitis.

It has been said the score obtained can be used as a guide to determine which patients require observation and which patients require surgery. Those with a score of 5 or 6 required observation while those with a score of 7 or above goes for surgery.

SCORE CARD

Symptoms

Migration -1

Anorexia-acetone -1

Nausea-vomiting -1

Signs

Tenderness in right lower quadrant - 2

Rebound pain -1

Elevation of temperature[37.3*C] - 1

Laboratory

Leukocytosis 10.0 $x10^9/L$ - 2

Shift to the left 75% - 1

PEDIATRIC APPENDICITIS SCORE

Table 1

Pediatric appendicitis score[12]

Symptom	Score
Anorexia	1
Pyrexia	1
Nausea or vomiting	1
Migration of pain	1
Raised white cell count	1
Raised neutrophil count	1
RIF tenderness	2
Cough/percussion/hopping tenderness	2

OTHER SCORING SYSTEMS FOR APPENDICITIS

Tzanakis scoring system

Compares ultrasound scanning with clinical and laboratory findings to bringout diagnosis of appendicitis

Appendicitis inflammatory response scoring system

It includes

- Right iliac fossa pain
- Rebound tenderness
- Muscular defense
- WBC count
- Neutrophilia
- C-reative protein
- Emesis

The Ohmann scoring system

It includes

- Right iliac fossa pain

- Rebound tenderness
- No micturition difficulties
- Steady pain
- Wbc count > $10x10^9$ / L
- Age < 50yrs
- Shifting of pain to RIF and rigidity

The Lintula scoring system

It includes 35 symptms and signs

Fenyo Lindberg scoring system

It includes nine clinical and one laboratory finding.

DIFFERENTIAL DIAGNOSIS

Surgical

• Intestinal obstruction • Intussusception • Acute cholecystitis • Perforated peptic ulcer • Mesenteric adenitis • Meckel's diverticulitis • Colonic diverticulitis • Pancreatitis • Rectus sheath haematoma

Urological

• Right ureteric colic • Right pyelonephritis • Urinary tract infection

Gynaecological

• Ectopic pregnancy • Ruptured ovarian follicle • Torted ovarian cyst

• Salpingitis/pelvic inflammatory disease

Medical

• Gastroenteritis • Pneumonia • Terminal ileitis • Diabetic ketoacidosis

• Pre-herpetic pain on the right 10th and 11th dorsal nerves • Porphyria

INVESTIGATIONS

The following laboratory tests do not have findings specific for appendicitis, but they may be helpful to confirm diagnosis in patients with an atypical presentation:

- CBC
- C-reactive protein (CRP)
- Liver and pancreatic function tests
- Urinalysis (for differentiating appendicitis from urinary tract conditions)
- Urinary beta-hCG (for differentiating appendicitis from early ectopic pregnancy in women of childbearing age)
- Urinary 5-hydroxyindoleacetic acid (5-HIAA)

CBC

WBC >10,500 cells/µL: 80-85% of adults with appendicitis. Neutrophilia >75-78% of patients. Significant neutrophilia can be seen with an elevated WBC count. But an elevated WBC count doesnot mount importance in elderly and infants because of their response to infections. Other status like pregnancy shows leukocytosis which interferes the study.

C-reactive protein

CRP levels are usually elevated in case of appendicitis. Very high values shows gangrenous modification of the disease. It is more consistent when it is associated with an elevated WBC count and neutrophilia.

Urinary 5-HIAA

HIAA levels increase significantly in acute appendicitis and decrease when the inflammation goes to necrosis of the appendix.So when such a decrease could be encountered an early warning sign of perforation of the appendix should be kept in thought.

RADIOLOGICAL INVESTIGATIONS

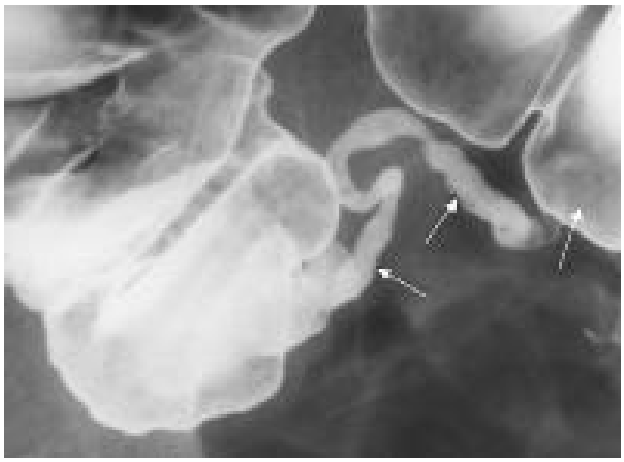
The radiologic findings in the appendicitis is mainly on the basis of

- Inflammatory changes
- Luminal obliteration
- Appendicolith

Plain X-ray abdomen – Almost normal in more than half of the patients. It may show calcified appendix at times.

CALCIFIED APPENDIX

Barium enema – Non – filling appendix may be visualized . But it is an invasive test.



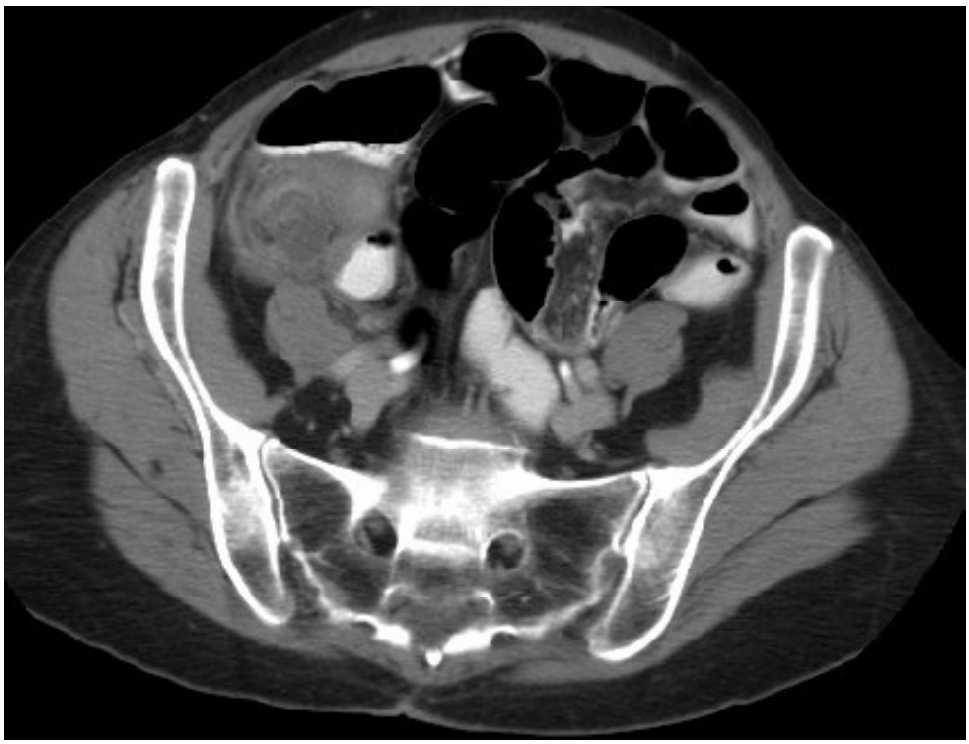
CONTRAST FILLED APPENDIX IN BARIUM STUDY

Ultrasonography

- Shows blind ending ,tubular ,non compressible ,aperistaltic structure
- Diameter of >6mm , laminated wall
- Increased peri-appendiceal echogenicity
- Fecoliths
- Increased vascularity
- Signs of perforation and abscess – thickened adjacent bowel wall , fluid collections and hypoechoeic mass

CT scan

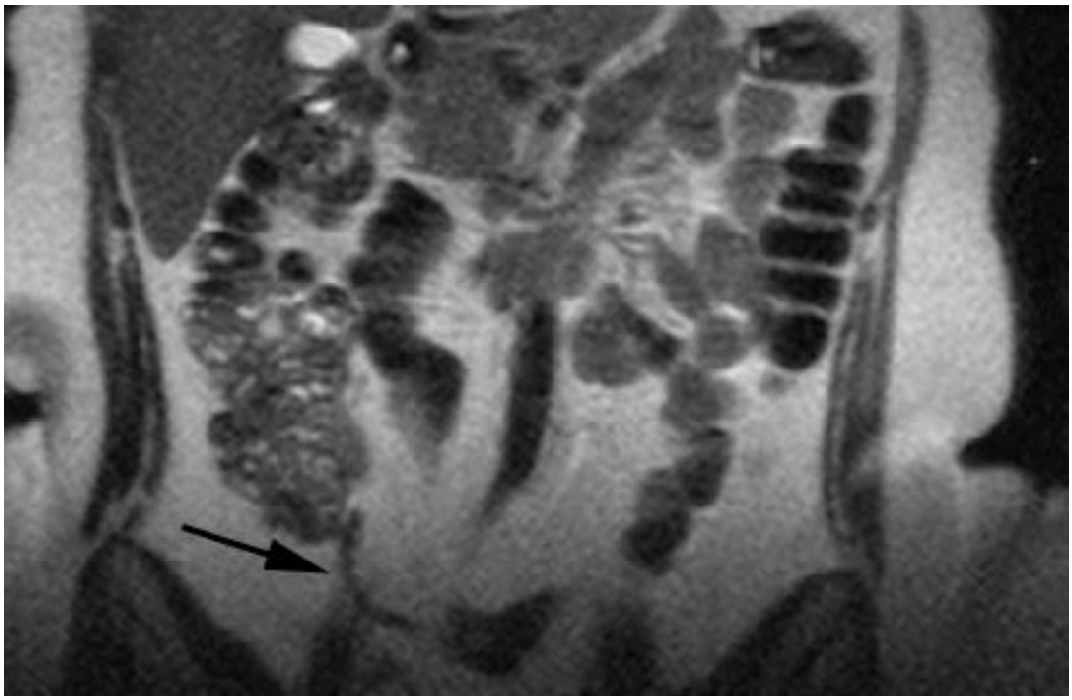
- Accuracy is more
- Shows enlarged and inflamed appendix
- Fecolith
- Non – contrast filled
- Wall enhancement and fat stranding
- Abscess
- Focal thickening of caecum
- Lymphadenopathy and free fluid



PERIAPPENDICEAL ABSCESS

MRI scan

- Useful in pregnancy
- To identify an abnormal appendix in atypical location
- To visualize adjacent inflammatory process.



MR PICTURE

The above mentioned investigations are not done routinely. Some investigations are done specifically to rule out certain cause of appendicitis or to rule out other possibilities.

TREATMENT

The most controversial part in appendicular mass is its management protocol. At present there are 4 methods

- Conservative treatment followed by interval appendectomy
- Totally conservative treatment with no surgery
- Early appendectomy
- Recently laprascopic appendectomy

Conservative management

Ochsner Sherren Regime

- Treating the patient in propped u position to make the exudative fluid to come to pelvis by gravity.
- To maintain nil per oral for 24-48 hrs
- Iv antibiotics
- If patient improves, slowly patient is started to consume oral liquids.
- After 6 weeks interval appendectomy is done.
- If patient deteriorates by features of peritonitis , increased pulse rate ,then surgery is warranted.

COMPARISON OF CONSERVATIVE WITH EMERGENCY SURGERY

	Advantages	Disadvantages
Conservative Approach	▪ Safe ▪ Allows acute episode to settle	▪ >40% cases recur ▪ Delayed surgery in failure patients is dangerous ▪ Costly and interval appendectomy may be needed ▪ Complication rate is 12-25%
Emergency Surgery	▪ Safe ,feasible and cost effective	▪ Difficult in delayed cases

	▪ No need for interval appendectomy ▪ Deals with pathology and others rapidly	▪ Unnecessary intervention may be performed ▪ Higher complication rate

Articles supporting on Emergency Surgery for Appendiceal Mass

Vakili-1976- Early surgery is safe, feasible, has short hospital stay,

and has no major morbidity

Foran et al.-1978-Early surgery has shorter hospital stay than the

conservative approach

Marya et al.-1993-Early surgery is safe, feasible, and cost-effective.It has comparable infection rate, operating time,and hospital stay to conservative approach

Samuel et al.-2002-Early surgery is beneficial, but interval appendectomy is needed for those treated conservatively

De and Ghosh-2002-Early surgery is associated with low cost,low morbidity, and short hospital stay

Tingstedt et al.-2002-Early surgery is associated with complications.

Conservative approach is advocated

Erdogan et al.-2004-Early surgery has a high complication rate(26.3%)

Articles supporting on Laparoscopic Appendicectomy for Appendiceal Mass

Vargas et al.-1994-safe with no morbidities.

Nguyen et al.-1999-No difference in Operative time. Hospital stay is shorter after laprascopic appendectomy.

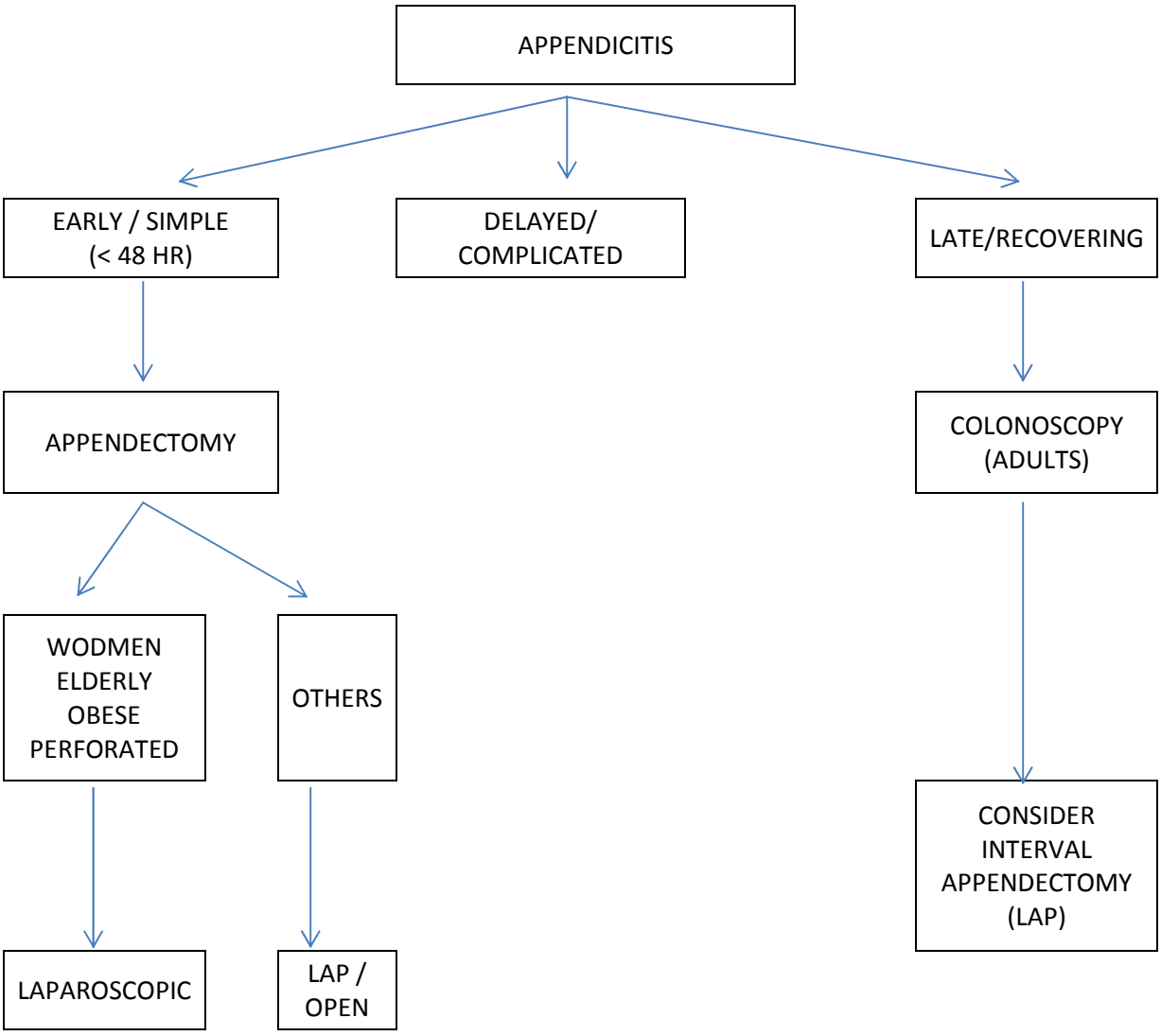
Senapati-2002-Comparable Operative time and hospital stay to Laprascopic appendectomy in non-mass.

Gibeily et al.-2003-No difference in operative time and hospital stay.

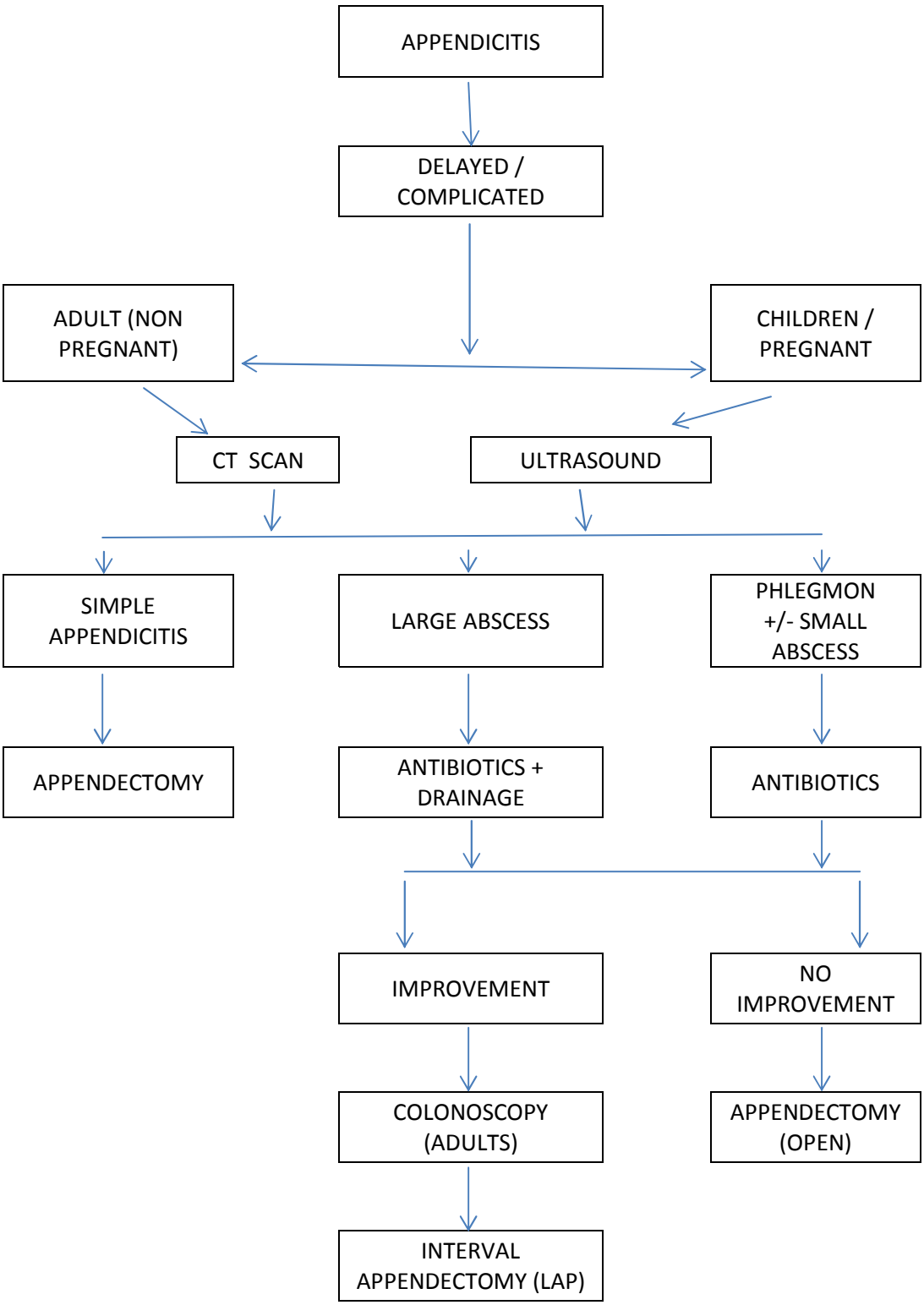
Goh et al.-2005-Longer operative time and hospital stay than non mass appendicitis.

Owen et al.-2006-Laprascopic appendectomy can be safely performed with minimal morbidity and scarring.

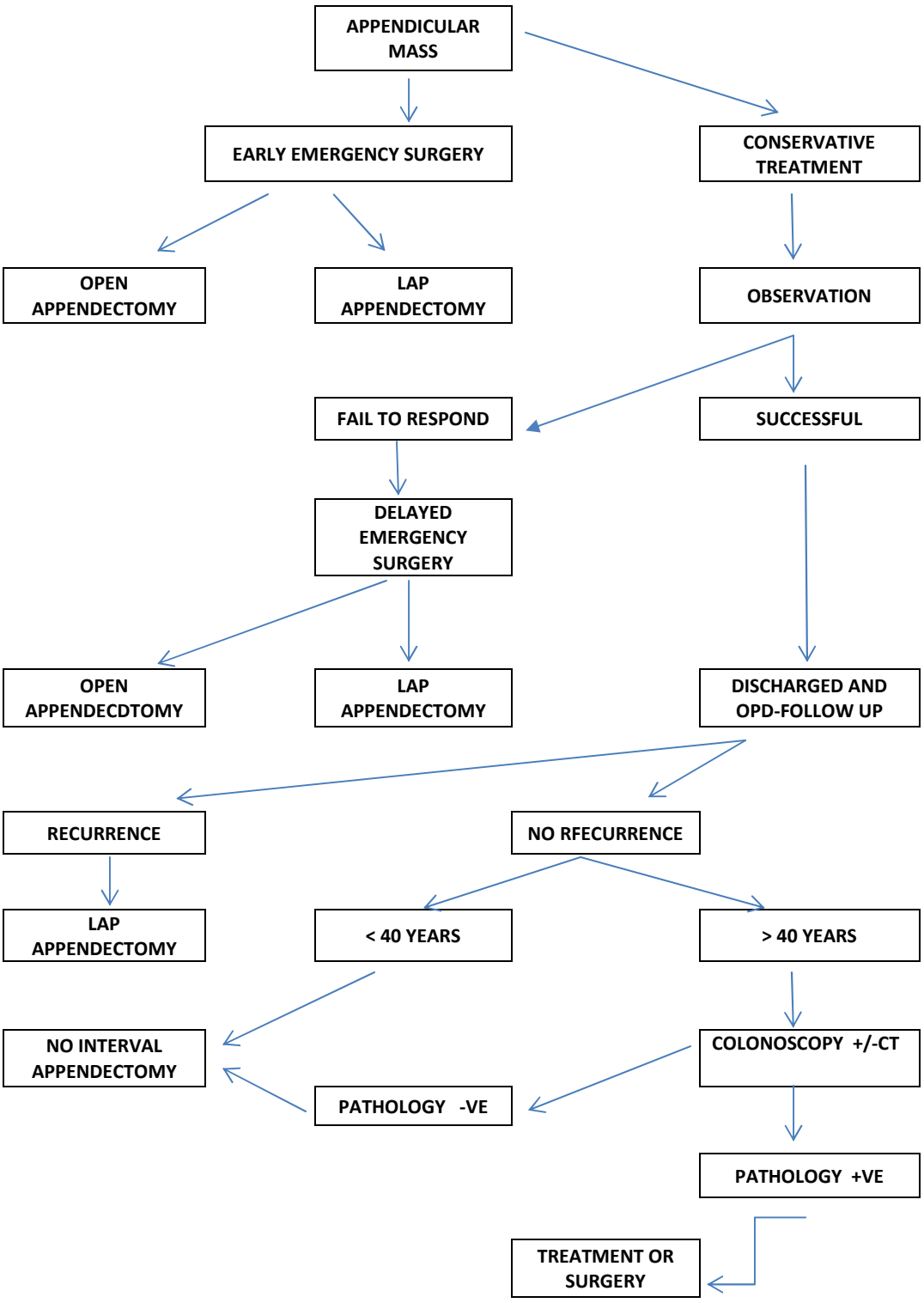
Treatment summary of Appendicitis – Early and Late stage



Treatment – Delayed stage



Algorithm for treating appendicular mass:



MATERIALS AND METHOD

PLACE OF STUDY:

All surgical units of department of general surgery, stanley medical college and hospital

DURATION:

JAN 2013 TO NOV 2013

STUDY DESIGN:

Prospective study

PATIENT SELECTION:

- all cases of acute appendicitis taken up for emergency surgery.

EXCLUSION CRITERIA:

- patient diagnosed as appendicular mass or conservative management for the same
- patient who refuses surgery
- patient absconded before full clinical evaluation

- patient who has not come for follow up

METHODOLOGY:

Patients admitted in our hospital with abdominal pain corresponding to right iliac fossa from Jan 2013 to Nov 2013.

Patients are subjected to appropriate surgery and are observed postoperatively for any immediate complications and are discharged after the adequate observation time.

Patients are asked to come for follow up once a month for a minimum of 6 months and examined for any complications.

PROFORMA

- NAME : SL. NO:
- AGE /SEX:
- ADDRESS WITH CONTACT NUMBER:
- IP NO:
- DATE OF ADMISSION:
- DATE OF SURGERY:
- DATE OF DISCHARGE:

HISTORY OF PRESENTING ILLNESS:

- PAIN:
- SITE-
- DURATION-
- NATURE-
- AGGRAVATING / RELEIVING FACTORS-

- FEVER:
- VOMITING:

PAST HISTORY:

WHETHER A KNOWN CASE OF DM / HYPERTENSION / ASTHMA / TB / EPILEPSY / CARDIAC ILLNESS

H/O SIMILAR EPISODES IN THE PAST, IF ANY:

H/O MAJOR ILLNESS/ HOSPITAL ADMISSIONS, IF ANY

PERSONAL HISTORY:

SMOKER / ALCOHOLIC

LMP AND MENSTURAL HISTORY IN FEMALES

FAMILY HISTORY:

TREATMENT HISTORY:

CLINICAL EXAMINATION:

GENERAL EXAMINATION:

SYSTEMIC EXAMINATION:

CVS

RS

PER ABDOMEN:

CLINICAL DIAGNOSIS:

INVESTIGATIONS:

- ROUTINE INVESTIGATIONS(CBC,RFT,CXR,ECG)
- OTHER INVESTIGATIONS(IF ANY):

FINAL DIAGNOSIS:

SURGERY DONE:

POST OPERATIVE COMPLICATIONS, IF ANY:

FEVER

PELVIC ABSCESS

PERFORATION

FISTULA

SEPSIS

FOLLOW UP:

RESULTS AND DISCUSSION

In this study 54 cases of acute appendicitis which were taken up for emergency appendectomy and were per-operatively found as appendicular mass was studied.

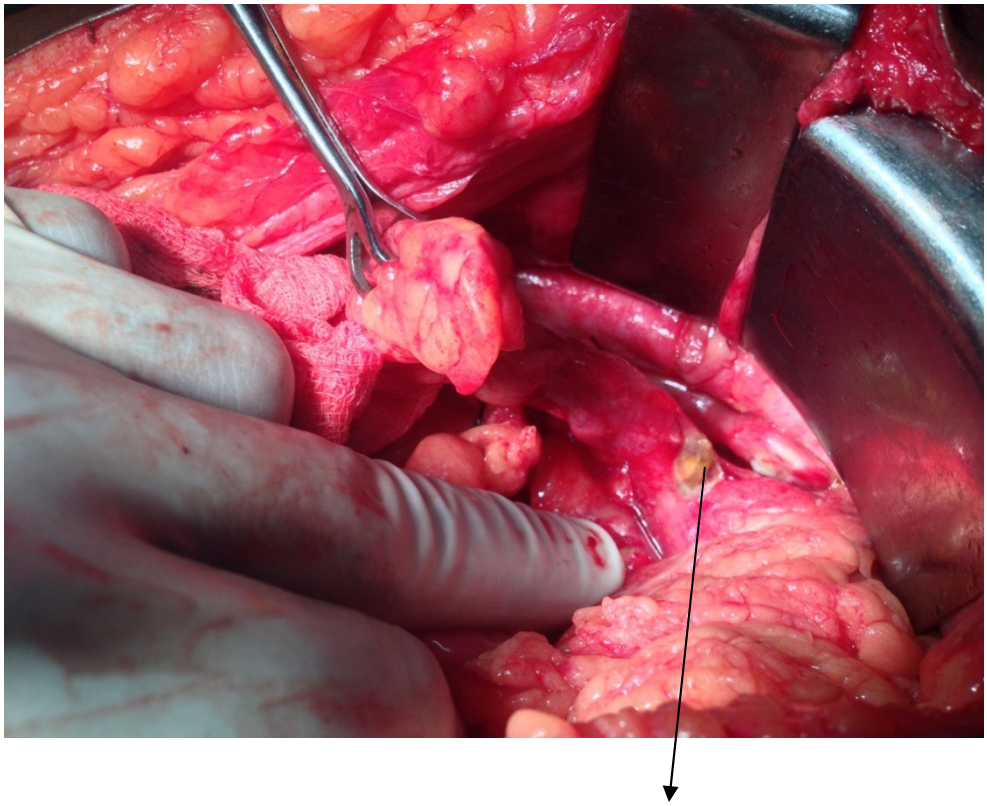
On summarizing the history of the patient ,they had pain around the umblicus initially and then gradually localized to the right iliac fossa. Patients had delayed their initial show up by various reasons and had come to the casualty with severe right iliac fossa pain. For them all relevant investigations were done. The advocated procedure aand its complications were explained to the patient.

The patient subjected to emergency appendectomy and was discharged. The patient was followed up for a period 4-6 months.The following observation were made and tabulated as

- Operative findings
- Total operating time
- Post operative complications.

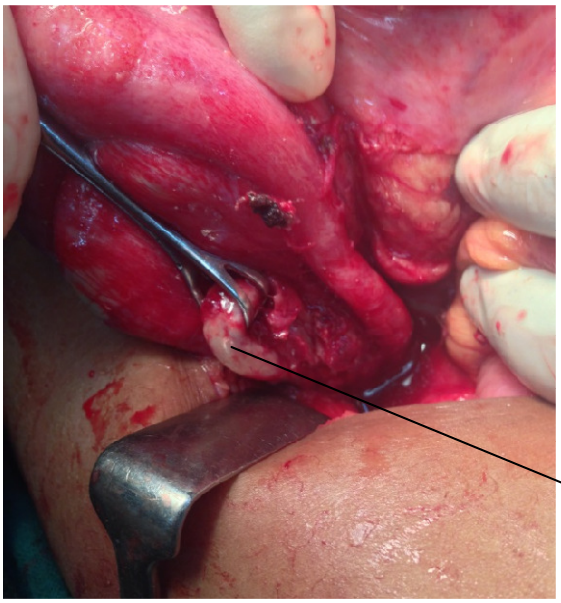
The operative findings of some patients are shown below. The operative timings and the operative findings determine the outcome of the surgery.

The below picture shows a perforated appendix in an 18 year old female patient operated. Here the perforation is very close to the caecum. But in this we went for appendectomy alone . After that thorough wash was given. Drainage tube kept insitu. Drainage tube collections were only serous collections. Patient developed high grade fever which got eventually settled. Post operative period other than fever was uneventful.



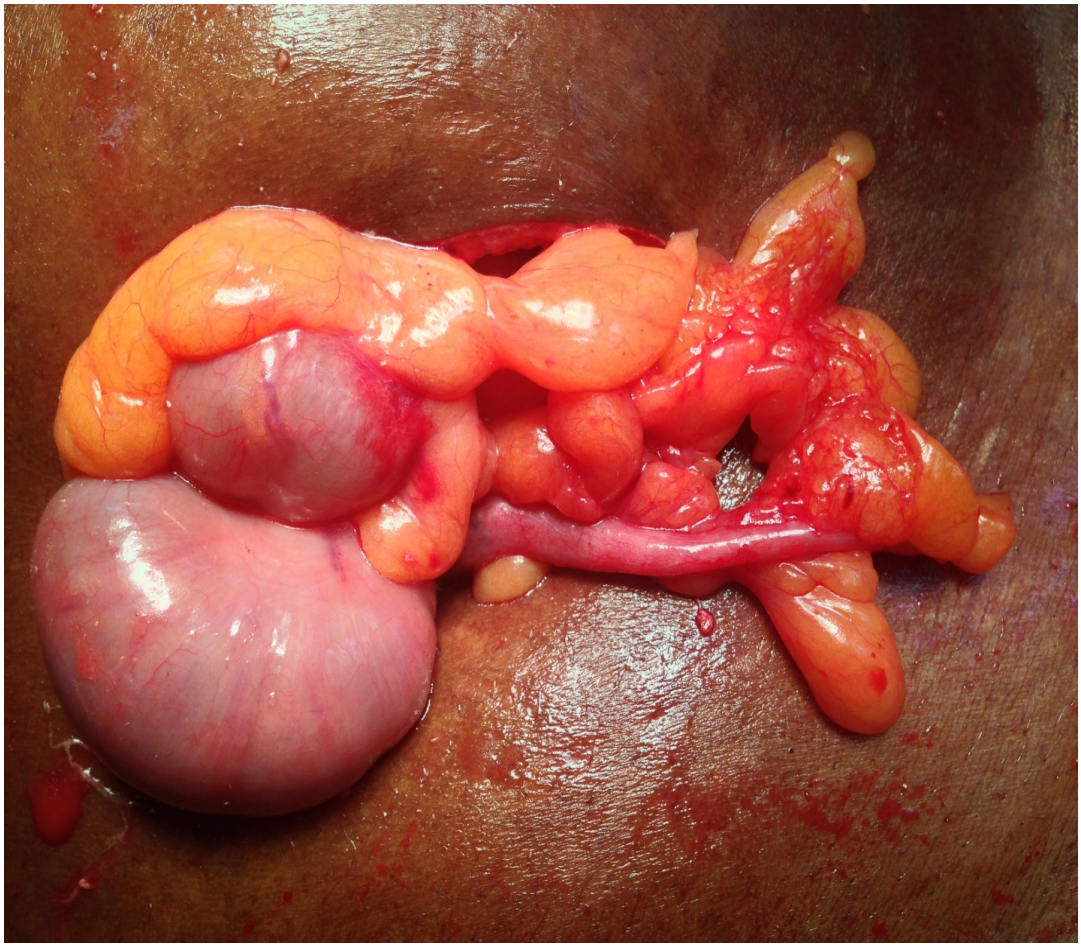
PERFORATED APPENDIX

Another case a 23 yr old male patient had a firmly adherent appendix to the wall of the caecum. In this the adhesions were released and appendectomy done. The patient developed fever post operatively. Patient was discharged on the tenth post operative day.



FIRM ADHESIONS

The picture shown below is a simple mass of the appendix. The appendix is separated from the omental adhesions and the ileal wall. Appendectomy was done. Patient had an uneventful postoperative period. Only some of the patients who underwent surgery came with pelvic collections.



A SIMPLE MASS APPENDIX SEPARATED FROM THE OMENTAL COVERING AND ADJACENT ILEUM AND CAECAL LOOPS

In some of the cases underwent surgery loculated pus were minimally found. In such cases appendectomy done thorough wash was given and drainage tube was kept insitu.

Operative findings

SIMPLE MASS	33 (60%)
FIRM ADHESIONS	11 (20%)
LOCULATED COLLECTION OF PUS	6 (10%)
PERFORATED APPENDIX	2 (5%)
APPENDICULAR ABSCESS	2 (5%)

Operative duration

30 - 60 mins	11 (21%)
60 - 90 mins	42 (78%)
90 - 120 mins	1 (1%)
> 120 mins	NIL

On the basis of post-operative complications

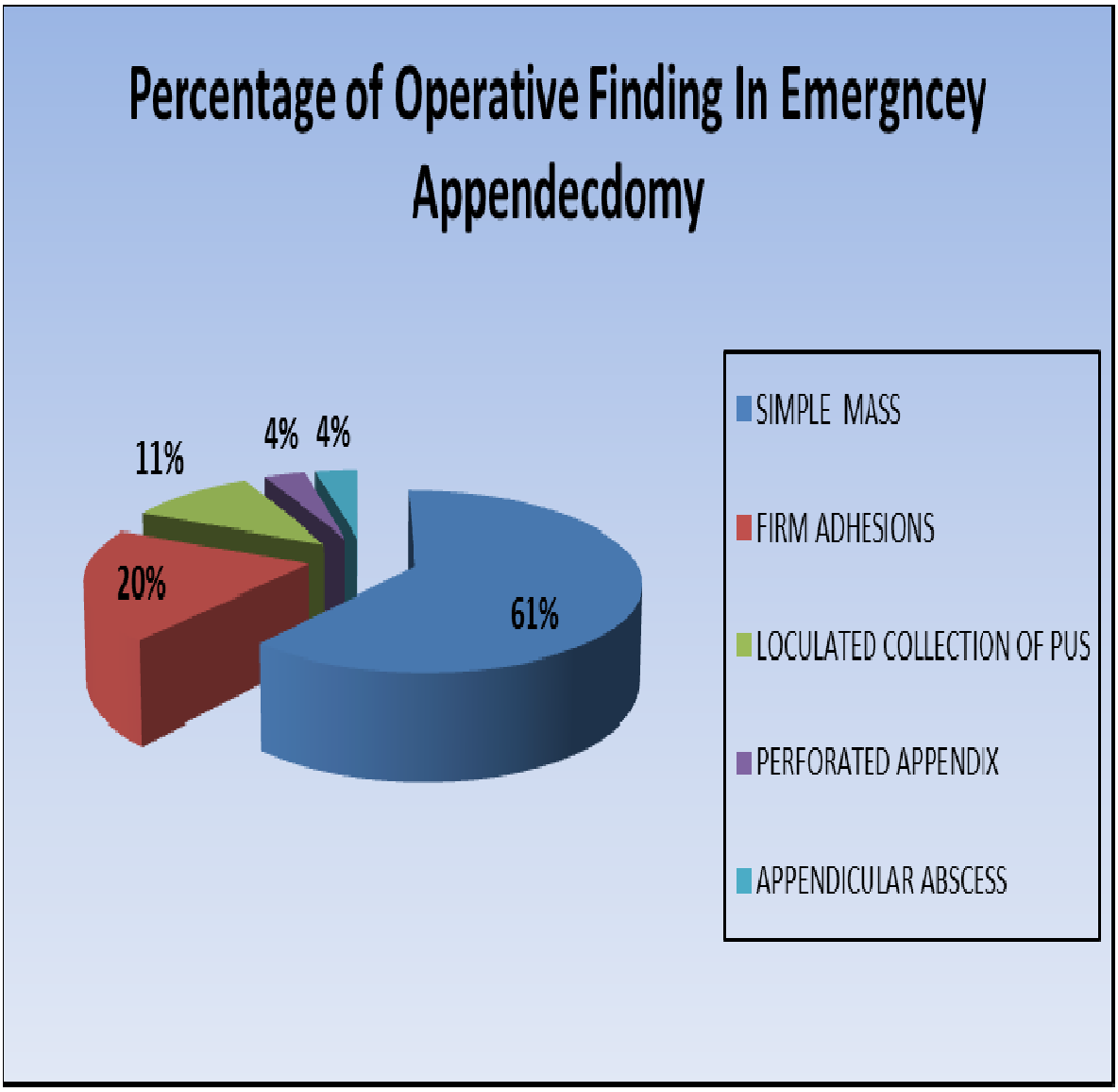
FEVER	14
PELVIC ABSCESS	4
PERFORATION	NIL
FISTULA	1
SEPSIS	NIL
UNEVENTFUL	35

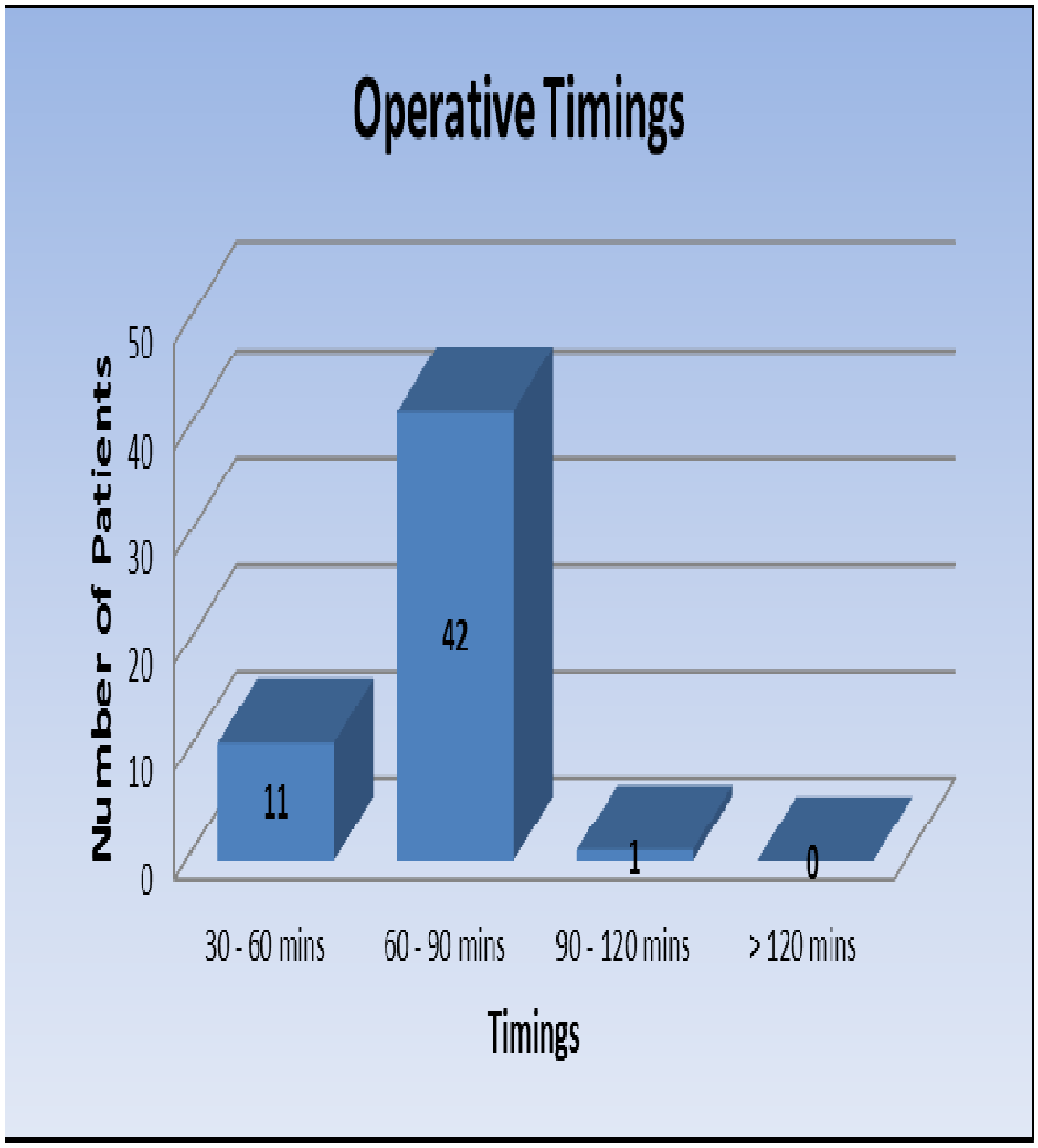
Seeing the reslts obtained most of the appendicular mass intervened are only simple in nature. Simple mass can be operated with a short time span. It has minor post operative complications. As the operative findings changes from minor to moderate and severe the operative timings increases. The post operative complications vary as the timing and severity of the disease changes.

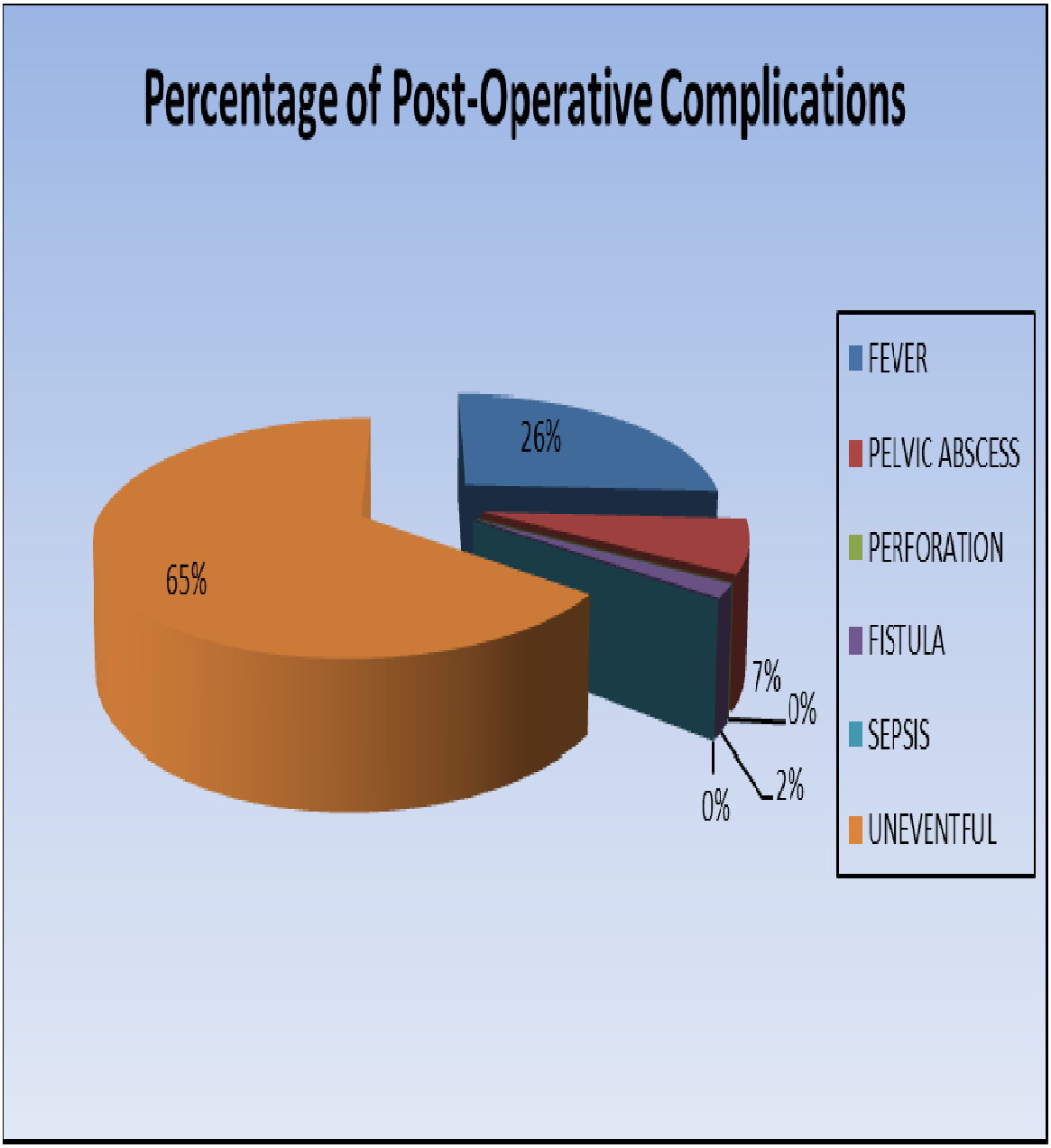
One patient in the study came out with fistula formation. Patient was vigorously treated with fluids and antibiotics. He settled down on treating conservatively

Based on the above findings we can see that intervening appendicular mass at the earliest may be safe and saves time. It also ensures that complete recovery is attained during the first admission itself and also excludes other possibilities .

In our country if appendectomy is delayed, for a period of 6-8 weeks based on the conservative and interval appendectomy,the patient turn over rate will be very poor. Even if there is mild pain patient may not come for medical treatment. Most of the patients live below poverty line and their complaince level is not to the expected limit. Hence emergency appendectomy either open or through laprascopic appendectomy can be attempted SAFELY for appendicular mass.


Percentage of Operative Finding In Emergncey Appendecdomy
11%
4%
4%
20%
61%
SIMPLE MASS
FIRM ADHESIONS
LOCULATED COLLECTION OF PUS
PERFORATED APPENDIX
APPENDICULAR ABSCESS


Operative Timings
Number of Patients
50
40
30
20
10
0
11
42
1
0
30 - 60 mins
60 - 90 mins
90 - 120 mins
> 120 mins
Timings


Percentage of Post-Operative Complications
26%
65%
7%
0%
0%
2%
FEVER
PELVIC ABSCESS
PERFORATION
FISTULA
SEPSIS
UNEVENTFUL

CONCLUSION

1) Appendicitis complicated by appendicular mass formation is encountered by delay in initial treatment.
2) Appendicular mass intervened by emergency surgery ensures complete recovery for the patient at first admission.
3) Emergency appendectomy rules out other possibilities.
4) The peroperative findings and operative timings decide the outcome of the surgery.
5) On follow up the most common complication is fever.
6) Initial intervention reduces the hospital stay and further morbidities.
7) To conclude Emergency appendectomy is safe and feasible in appendicular mass.

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ANNEXURES

INSTITUTIONAL ETHICAL COMMITTEE,
STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work : A study on emergency appendectomy in peroperative appendicular mass

Principal Investigator : Dr.M.Surendar

Designation : PG in M.S.(Gen.Sur)

Department : Department of General Surgery
Government Stanley Medical College,
Chennai-10

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 08.04.2013 at the Council Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

19/12/13

MEMBER SECRETARY,
IEC, SMC, CHENNAI

தகவல் படிவம்

ஆய்வில் பங்கேற்கும் நோயாளியின் கடமைப் பொறுப்புகள்

உங்களை கவனித்துக் கொள்ளும் மருத்துவருடன் நீங்கள் முழுமையாக ஒத்துழைக்க வேண்டும் என்று உங்களைக் கேட்டுக் கொள்கிறோம். சிகிச்சையளிக்கும் மருத்துவர் அளிக்கும் அறிவுரைகளை பின்பற்ற வேண்டும் என்றும், என்னென்ன செய்ய வேண்டும், என்னென்ன செய்யக்கூடாது என்று உங்களிடம் கூறப்பட்டுள்ளவற்றிலிருந்து சற்றும் விலகக்கூடாது என்றும் நீங்கள் எதிர்பார்க்கப்படுகிறீர்கள்.

ஆய்வில் உங்கள் பங்கேற்பு மற்றும் உங்கள் உரிமைகள்

இந்த ஆய்வில் உங்கள் பங்கேற்பு தன்னிச்சையானது மற்றும் காரணங்கள் எதையும் கூறாமலேயே நீங்கள் இந்த ஆய்விலிருந்து எந்த ஒரு நேரத்திலும் விலகிக் கொள்ளலாம். எப்படியிருந்தாலும், உங்கள் உடல் நிலைக்கேற்ப உங்களுக்கு பொறுத்தமான சிகிச்சை அளிக்கப்படும். ஆய்வில் பங்கேற்க நீங்கள் மறுப்பதால், அடுத்து வரும் ஆராய்ச்சி ஆய்வுகளில் உங்கள் பங்கேற்பை மறுப்பது போன்ற எந்தவித அபராதமும் விதிக்கப்படாது. உங்களை கவனித்துக் கொள்ளும் மருத்துவருடன் முழுவமையாக ஒத்துழைக்க நீங்கள் சம்மதிக்க வேண்டும். எந்த ஒரு நேரத்திலும், நீங்கள் மோசமாக உணர்ந்தாலோ அல்லது வேறு ஏதேனும் உடல்நலக்குறைவு உண்டானாலோ, தயவு செய்து, உங்களை கவனித்து வரும் மருத்துவரிடம் உடனடியாக தெரிவிக்கவும். சிகிச்சை உங்களுக்குப் பொருத்தமாக இருக்காது என்று தோன்றினால் உடனடியாக நிறத்தப்படும். உங்கள் சம்மதம் இன்றியேகூட ஆய்வு நிறுத்தப்படுவது சாத்தியமே. ஆய்வின்பொழுது ஏதேனும் புதிய தகவல் தெரியவந்தால், அதைப்பற்றி உங்கள் மருத்துவர் உங்களுக்கு தெரிவிப்பார்.

ஆய்வில் பங்கேற்பவர்/சட்டபூர்வமாக
ஏற்கப்பட்ட நபர் கையொப்பம்
அல்லது
பெருவிரல் பதிவு

சுய ஒப்புதல் படிவம்

ஆய்வு செய்யப்படும் தலைப்பு

குடல்–வால் சீல் நோயிற்கு அறுவை சிகிச்சை

ஆராய்ச்சி நிலையம் : பொது அறுவை சிகிச்சைப்பிரிவு
அரசு ஸ்டான்லி மருத்துவக் கல்லூரி,
சென்னை - 600 001.

பங்கு பெறுபவரின் எண் :

பங்கு பெறுபவரின்
பெயர் & விலாசம் :

எனக்கு வயிற்றில் புற்றுநோய் இருப்பதை மருத்துவர் மூலம் அறிந்து கொண்டேன். அதற்கு அறுவை சிகிச்சை அவசியம் என்பதையும் அதனால் வரும் விளைவுகளையும் மருத்துவர் மூலம் அறிந்து கொண்டேன். அதற்கு முழு மனதுடன் சம்மதம் தெரிவிக்கிறேன்.

மேலும் என்னுடைய மற்ற பரிசோதனை முடிவுகளையும் மருத்துவரும், மருத்துவமனையும் பயன்படுத்திக் கொள்ள முழு மனதுடன் சம்மதிக்கிறேன்.

இது தொடர்பாக விளக்கங்களையும் விளைவுகளையும் மருத்துவர் எனக்கு தெரிந்த மொழியில் விளக்கி கூறினார்.

பங்கு பெறுபவரின் கையொப்பம் ..... இடம் ..... தேதி .....

பெற்றோர்/கணவர்/மனைவி கையொப்பம்.....

ஆய்வாளரின் கையொப்பம் .....இடம் ..... தேதி .....

MASTER CHART

S.NO	NAME	AGE	SEX	OPERATIVE FINDING	OPERATIVE TIMINGS (MINS)	POST-OPERATIVE FOLLOW UP					
						FEVER	PELVIC ABSCESS	PERFORATION	FISTULA	SEPSIS	UN-EVENTFUL
1	HARI	21	MALE	SIMPLE MASS	65	–	–	–	–	–	+
2	MANI	24	MALE	FIRM AHESIONS	75	+	–	–	–	–	–
3	RENUKA	20	FEMALE	SIMPLE MASS	45	–	–	–	–	–	+
4	DEVI	18	FEMALE	SIMPLE MASS	45	–	–	–	–	–	+
5	ANBUSELVAN	25	MALE	SIMPLE MASS	65	–	–	–	–	–	+
6	SIVA	33	MALE	SIMPLE MASS	75	–	–	–	–	–	+
7	CHANDRAN	30	MALE	LOCULATED PUS	70	–	–	–	–	–	+
8	SELVI	16	FEMALE	SIMPLE MASS	55	–	–	–	–	–	+
9	KUMARAN	24	MALE	SIMPLE MASS	65	–	–	–	–	–	+
10	DEVAN	21	MALE	SIMPLE MASS	65	–	–	–	–	–	+
11	SAGAYAMARY	35	FEMALE	ABSCESS	75	+	–	–	–	–	–
12	BALA	34	MALE	FIRM AHESIONS	65	+	–	–	–	–	–
13	LOGA	23	FEMALE	SIMPLE MASS	60	–	–	–	–	–	+
14	MURUGAN	18	MALE	SIMPLE MASS	45	–	–	–	–	–	+
15	PRIYA	19	FEMALE	SIMPLE MASS	40	–	–	–	–	–	+
16	KRISHNAN	25	MALE	SIMPLE MASS	65	–	–	–	–	–	+
17	GUNA	27	MALE	LOCULATED PUS	75	+	–	–	–	–	–
18	VINOTH	32	MALE	FIRM AHESIONS	70	–	–	–	–	–	+
19	USHA	17	FEMALE	SIMPLE MASS	55	–	–	–	–	–	+
20	BOOPATHI	13	MALE	SIMPLE MASS	40	–	–	–	–	–	+
21	LAKHSMI	28	FEMALE	ABSCESS	80	+	+	–	–	–	–
22	DAS	24	MALE	SIMPLE MASS	60	–	–	–	–	–	+
23	ASHRAF	22	MALE	SIMPLE MASS	70	–	–	–	–	–	+
24	MYTHILI	29	FEMALE	FIRM AHESIONS	75	+	–	–	–	–	–
25	KANNAMMA	40	FEMALE	LOCULATED PUS	80	+	–	–	–	–	–
26	KALIDAS	22	MALE	SIMPLE MASS	65	–	–	–	–	–	+
27	ZAHEER	24	MALE	SIMPLE MASS	70	–	–	–	–	–	+

28	SAROJA	19	FEMALE	SIMPLE MASS	55	_	_	_	_	_	+
29	PERUMAL	24	MALE	SIMPLE MASS	60	_	_	_	_	_	+
30	MARIMUTHU	37	MALE	LOCULATED PUS	80	+	_	_	_	_	_
31	RATHINAM	33	MALE	FIRM AHESIONS	75	+	_	_	_	_	_
32	PRINCY	24	FEMALE	SIMPLE MASS	70	_	_	_	_	_	+
33	BABU	23	MALE	SIMPLE MASS	75	_	_	_	_	_	+
34	KANNAGI	28	FEMALE	FIRM AHESIONS	85	_	_	_	_	_	+
35	BALA RAMAN	25	MALE	SIMPLE MASS	70	_	_	_	_	_	+
36	UMA	19	FEMALE	SIMPLE MASS	75	_	_	_	_	_	+
37	ANJALI	17	FEMALE	SIMPLE MASS	50	_	_	_	_	_	+
38	GOPI	27	MALE	FIRM AHESIONS	80	_	_	_	_	_	+
39	MEGALA	26	FEMALE	LOCULATED PUS	75	+	_	_	_	_	_
40	DAWOOD	33	MALE	FIRM AHESIONS	60	_	_	_	_	_	+
41	MALLIGA	29	FEMALE	SIMPLE MASS	65	_	_	_	_	_	+
42	SHANMUGAM	32	MALE	LOCULATED PUS	65	+	+	_	_	_	_
43	AMUDHA	27	FEMALE	SIMPLE MASS	60	_	_	_	_	_	+
44	RAJA	23	MALE	SIMPLE MASS	65	_	_	_	_	_	+
45	SANKAR	18	FEMALE	PERFORATED APPENDIX	85	+	_	_	_	_	_
46	VALLI	21	FEMALE	FIRM AHESIONS	75	_	_	_	_	_	+
47	GOVINDASAMY	38	MALE	PERFORATED APPENDIX	96	+	+	_	+	_	_
48	RAJESHWARI	20	FEMALE	SIMPLE MASS	60	_	_	_	_	_	+
49	KANAGAVALLI	36	FEMALE	SIMPLE MASS	65	_	_	_	_	_	+
50	MUNUSAMY	32	MALE	FIRM AHESIONS	65	_	_	_	_	_	+
51	DAVID	15	MALE	SIMPLE MASS	50	_	_	_	_	_	+
52	SELVI	16	FEMALE	SIMPLE MASS	55	_	_	_	_	_	+
53	YUSUF	23	MALE	FIRM AHESIONS	75	+	+	_	_	_	_
54	YASODHA	25	FEMALE	SIMPLE MASS	65	_	_	_	_	_	+